

# **National Grid SA-COA**

## **PRODUCTION FILE**

**Contractor : ABB Contracting Co.**

**Project : SS 8709- 132/13.8kV in Alkharj City**

**Contract No : 11131113/00**

**Substation : 8709**

**Subject : 132Kv Busbar Protection Set-1 (+BBP1-5)  
Relay Panel-5**

**ABB**



POWER SYSTEMS NETWORK MANAGEMENT  
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS  
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.  
414, AL-KHARJ ROAD  
SECOND INDUSTRIAL CITY  
RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company  
CLIENT : National GridSA  
PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY  
SUBSTATION : S/S 8709  
CONTRACT NO. : 11131113/00  
TITLE : Assembly Drawing - +BBP1-5  
[132KV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL]

AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **11131113/00** JOB ORDER NO. **S-13656**

|           |              |                        |   |
|-----------|--------------|------------------------|---|
| <b>01</b> | <b>13 49</b> | <b>FACTORY ASBUILT</b> | DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b>           |
| <b>00</b> | <b>13 05</b> | <b>FOR APPROVAL</b>    | DATE STARTED <b>28.01.2013</b> DATE COMPLETED _____ |
| REV. NO.  | DATE         | DESCRIPTION            | OPRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b>  |

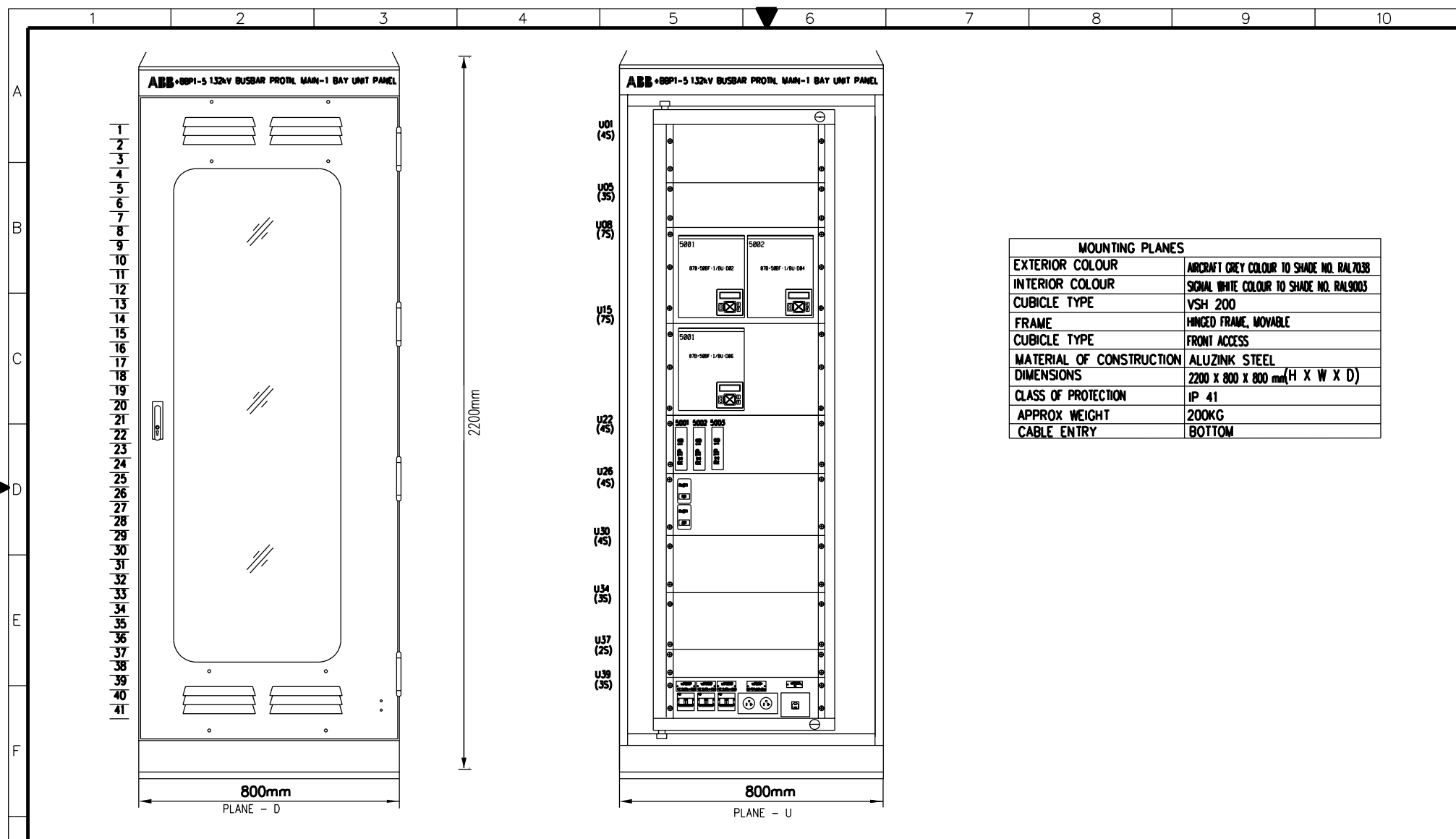
### COVER SHEET

**132KV BUSBAR PROT.N.MAIN-1 BU PANEL +BBP1-5**  
**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**  
**RIYADH SAUDI ARABIA**

الشركة الوطنية لنقل الكهرباء



| INDEX | PLANT NO.   | DRAWING NUMBER   | SHEET NO.      | REV. NO.  |
|-------|-------------|------------------|----------------|-----------|
| -     | <b>C421</b> | <b>CD-322998</b> | <b>G00 G01</b> | <b>01</b> |



| MOUNTING PLANES          |   |
|--------------------------|---|
| EXTERIOR COLOUR          | AIRCRAFT GREY COLOUR TO SHADE NO. RAL7038 |
| INTERIOR COLOUR          | SIGNAL WHITE COLOUR TO SHADE NO. RAL9003  |
| CUBICLE TYPE             | VSH 200                                   |
| FRAME                    | HINGED FRAME, MOVABLE                     |
| CUBICLE TYPE             | FRONT ACCESS                              |
| MATERIAL OF CONSTRUCTION | ALUZINK STEEL                             |
| DIMENSIONS               | 2200 x 800 x 800 mm (H X W X D)           |
| CLASS OF PROTECTION      | IP 41                                     |
| APPROX. WEIGHT           | 200KG                                     |
| CABLE ENTRY              | BOTTOM                                    |

AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

01

13 49

FACTORY ASBUILT

00

13 05

FOR APPROVAL

REV. NO.

DATE

DESCRIPTION

DRAWN BY RIZ

CHECKED BY KVR

DATE STARTED 28.01.2013

DATE COMPLETED \_\_\_\_\_

OPRG. DEPT. CTPD

ENG. DEPT. AUT-PSAC

ASSEMBLY DRAWING


132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBP1-5

S/S 8709 - 132/13.8KV IN AL-KHARJ CITY

RIYADH

SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء



National Grid sa

INDEX

PLANT NO.

DRAWING NUMBER

SHEET NO.

SHT CONT.

REV. NO.

-

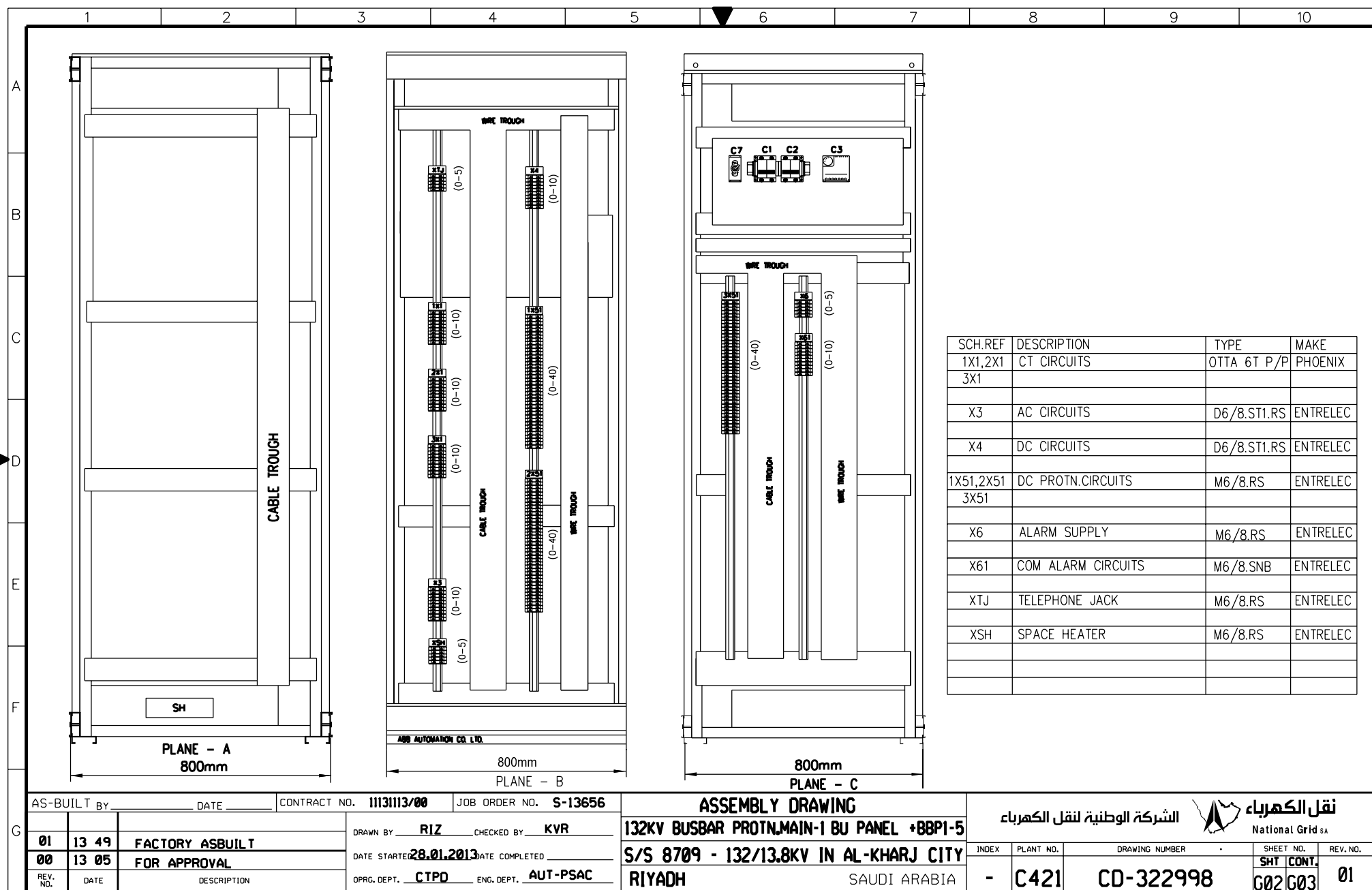
C421

CD-322998

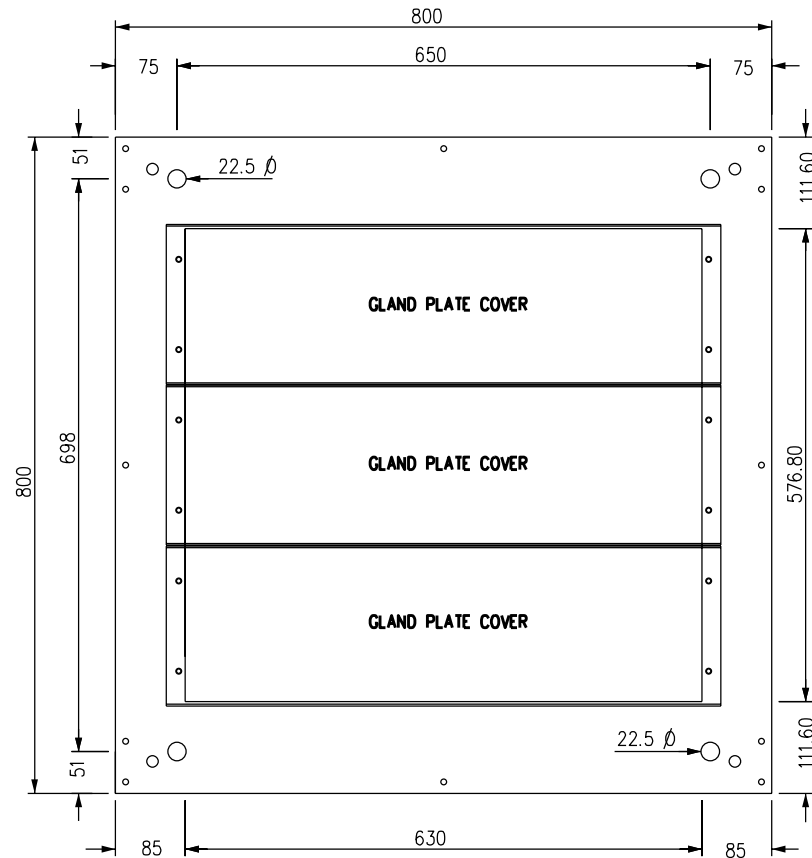
G01

G02

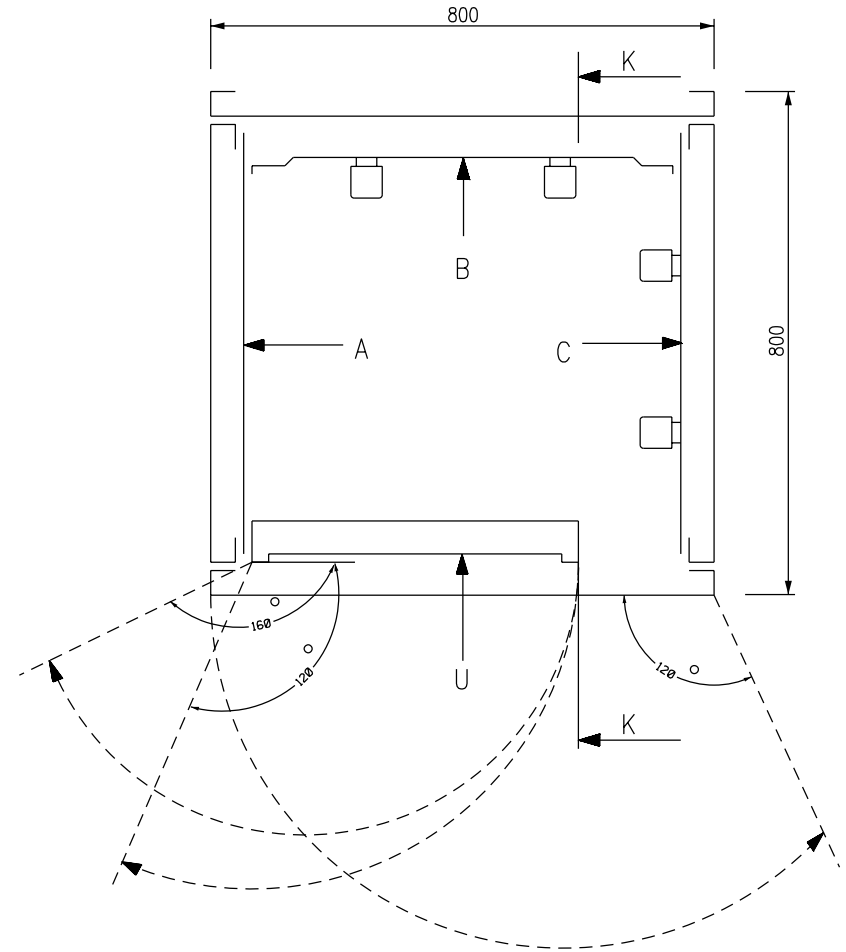
01



# BASE PLATE/ FOUNDATION



# PLAN



AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **11131113/00** JOB ORDER NO. **S-13656**

| 01       | 13 49 | FACTORY ASBUILT |
|----------|-------|-----------------|
| 00       | 13 05 | FOR APPROVAL    |
| REV. NO. | DATE  | DESCRIPTION     |

DRAWN BY **RIZ** CHECKED BY **KVR**  
 DATE STARTED **28.01.2013** DATE COMPLETED \_\_\_\_\_  
 OPRG. DEPT. **CTPD** ENG. DEPT. **AUT-PSAC**

## ASSEMBLY DRAWING

**132KV BUSBAR PROTN.MAIN-1 BU PANEL +8BP1-5**  
**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**  
**RIYADH SAUDI ARABIA**

الشركة الوطنية لنقل الكهرباء



| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO.            | REV. NO. |
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| -     | C421      | CD-322998      | SHT CONT.<br>G03 G04 | 01       |

NG/D2-D (2012/01)

DMS VECTOR NGD200

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|   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| A |   |   |   |   |   |   |   |   |   |    |
| B |   |   |   |   |   |   |   |   |   |    |
| C |   |   |   |   |   |   |   |   |   |    |
| D |   |   |   |   |   |   |   |   |   |    |
| E |   |   |   |   |   |   |   |   |   |    |
| F |   |   |   |   |   |   |   |   |   |    |
| G |   |   |   |   |   |   |   |   |   |    |

TOP VIEW FOR EARTHING BAR

U PLANE TOP LABEL

U PLANE BOTTOM LABEL

MANUFACTURING LABEL

ABB Automation Co.Ltd.

PROJECT : National Grid SA S/S 8709

ORDER REFERENCE : 2875 RF S13656

YEAR OF MANUFACTURE: 2013

PANEL NO. : +BBP1-5

DRAWING NO. : S13656-CD-322999

MADE IN THE KINGDOM OF SAUDI ARABIA

|                              |  |                                      |  |  |  |  |  |                                |  |                    |  |
|------------------------------|--|--------------------------------------|--|--|--|--|--|--------------------------------|--|--------------------|--|
| AS-BUILT BY _____ DATE _____ |  | CONTRACT NO. 11131113/00             |  | JOB ORDER NO. S-13656                  |  | ASSEMBLY DRAWING                           |  | الشركة الوطنية لنقل الكهرباء   |  | نقل الكهرباء       |  |
| 01 13 49                     |  | FACTORY ASBUILT                      |  | DRAWN BY RIZ CHECKED BY KVR            |  | 132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBP1-5 |  | National Grid sa               |  |                    |  |
| 00 13 05                     |  | FOR APPROVAL                         |  | DATE STARTED 28.01.2013 DATE COMPLETED |  | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY     |  | INDEX PLANT NO. DRAWING NUMBER |  | SHEET NO. REV. NO. |  |
| REV. NO. DATE DESCRIPTION    |  | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC |  | RİYADH SAUDI ARABIA                    |  | - C421 CD-322998                           |  | G04 L00                        |  | 01                 |  |



POWER SYSTEMS NETWORK MANAGEMENT  
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS  
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD  
414, AL-KHARJ ROAD  
SECOND INDUSTRIAL CITY  
RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company  
CLIENT : National Gridsa  
PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY  
SUBSTATION : S/S 8709  
CONTRACT NO. : 11131113/00  
TITLE : LIST OF APPARATUS - +BBP1-5  
[132KV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL]

AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **11131113/00** JOB ORDER NO. **S-13656**

|          |       |                 |   |
|----------|-------|-----------------|---|
| 01       | 13 49 | FACTORY ASBUILT | DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b>           |
| 00       | 13 05 | FOR APPROVAL    | DATE STARTED <b>28.01.2013</b> DATE COMPLETED _____ |
| REV. NO. | DATE  | DESCRIPTION     | OPRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b>  |

### COVER SHEET

**132KV BUSBAR PROT.N.MAIN-1 BU PANEL +BBP1-5**  
**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**  
**RIYADH SAUDI ARABIA**

الشركة الوطنية لنقل الكهرباء



| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO.            | REV. NO. |
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| -     | C421      | CD-322998      | SHT CONT.<br>L00 L01 | 01       |








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|--|---|---|---|---|---|---|---|---|---|----|

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|---|--|--|--|--|------------------------------|--|--|--|--|--|---|--|--|--|
| AS-BUILT BY _____ DATE _____  |  |  | CONTRACT NO. <b>11131113/00</b>  |  | JOB ORDER NO. <b>S-13656</b> |  | <b>LIST OF APPARATUS</b><br><b>132KV BUSBAR PROTN.MAIN-1 BU PANEL +B8P1-5</b><br><b>S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b><br><b>RIYADH SAUDI ARABIA</b> |  |  |  | <b>نقل الكهرباء</b><br><b>الشركة الوطنية لنقل الكهرباء</b><br> <b>National Grid SA</b> |  |  |  |
| <b>01</b> <b>13 49</b> <b>FACTORY ASBUILT</b><br><b>00</b> <b>13 05</b> <b>FOR APPROVAL</b> |  |  | DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b><br>DATE STARTED <b>28.01.2013</b> DATE COMPLETED _____ |  |                              |  |  |  | INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO.<br><b>- C421 CD-322998 103104 01</b> |  |   |  |  |  |
| REV. NO. DATE DESCRIPTION<br>_____  |  |  | OPRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b>   |  |                              |  |  |  |  |  |   |  |  |  |

|   | 1                            | 2       | 3                        | 4   | 5  | 6    | 7  | 8           | 9              | 10                   |
|---|------------------------------|---------|--------------------------|---|--|------|--|-------------|----------------|----------------------|
| A | SR. NO.                      | GA REF. | SCH. REF.                | D E S C R I P T I O N   |  | SHT. | QTY.                                       | TYPE        | MAKE           | ORDERING INFORMATION |
|   | 41                           |         | 1X1,2X1,3X1              | BLOT CONNECTING TERMINAL BLOCKS DISCONNECTIBLE FOR CT CIRCUITS        |  | 301  | 30   | OTTA 6T P/P | PHOENIX        | 0790462              |
| B |                              |         | X3                       | SPRING LOADED TERMINAL BLOCKS DISCONNECTIBLE FOR AC CIRCUITS          |  | 301  | 10   | D6/8.ST1.RS | ENTRELEC       | 1SNA 115 831 R0400   |
|   |                              |         | X4                       | SPRING LOADED TERMINAL BLOCK FOR DC EXT. CIRCUITS                     |  | 301  | 10   | D6/8.ST1.RS | ENTRELEC       | 1SNA 115 831 R0400   |
| C |                              |         | 1X51.2X51,3X51           | SPRING LOADED TERMINAL BLOCK FOR DC PROT.N. CIRCUITS(EACH40)          |  | 301  | 120  | M6/8.RS     | ENTRELEC       | 1SNA 115 685 R1200   |
|   |                              |         | X6                       | SPRING LOADED TERMINAL BLOCK FOR ALM CIRCUITS                         |  | 301  | 5  | M6/8.RS     | ENTRELEC       | 1SNA 115 685 R1200   |
| D |                              |         | X61                      | KNIFE TYPE TERMINAL BLOCKS DISCONNECTIBLE FOR STN.-COM ALARM CIRCUITS |  | 301  | 10   | M6/8.SNB    | ENTRELEC       | 1SNA 115 688 R2500   |
|   |                              |         | XTJ                      | SPRING LOADED TERMINAL BLOCK FOR TELEPHONE JACK                       |  | 301  | 4  | M6/8.RS     | ENTRELEC       | 1SNA 115 685 R1200   |
| E |                              |         | XSH                      | SPRING LOADED TERMINAL BLOCKS FOR SPACE HEATER                        |  | 301  | 2  | M6/8.RS     | ENTRELEC       | 1SNA 115 685 R1200   |
|   |                              |         |                          |   |  |      |  |             |                |                      |
| F |                              |         |                          |   |  |      |  |             |                |                      |
|   |                              |         |                          |   |  |      |  |             |                |                      |
| G | AS-BUILT BY _____ DATE _____ |         | CONTRACT NO. 11131113/00 |   | JOB ORDER NO. S-13656                        |      | LIST OF APPARATUS                          |             |                |                      |
|   | 01                           | 13 49   | FACTORY ASBUILT          |   | DRAWN BY RIZ CHECKED BY KVR                  |      | 132KV BUSBAR PROTN.MAIN-1 BU PANEL +8BP1-5 |             |                |                      |
|   | 00                           | 13 05   | FOR APPROVAL             |   | DATE STARTED 28.01.2013 DATE COMPLETED _____ |      | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY     |             |                |                      |
|   | REV. NO.                     | DATE    | DESCRIPTION              |   | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC         |      | RIYADH SAUDI ARABIA                        |             |                |                      |
|   |                              |         |                          |   |  |      | INDEX                                      | PLANT NO.   | DRAWING NUMBER | SHEET NO.            |
|   |                              |         |                          |   |  |      | -  | C421        | CD-322998      | CONT. L04/L05        |
|   |                              |         |                          |   |  |      |  |             | REV. NO.       | 01                   |

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| LABEL REF. | LABEL ENGRAVING                   | MATERIALS           | ENGRAVING                            | LABEL SIZE | LETTER SIZE |
|------------|-----------------------------------|---------------------|--------------------------------------|------------|-------------|
| U08.5001   | U08.5001<br>878+508F-1/BU-D02     | TRAFOLITE           | BLACK LETTERS<br>ON WHITE BACKGROUND | 50X15mm    | 4mm         |
| U08.5002   | U08.5002<br>878+508F-1/BU-D04     | TRAFOLITE           | BLACK LETTERS<br>ON WHITE BACKGROUND | 50X15mm    | 4mm         |
| U15.5001   | U15.5001<br>878+508F-1/BU-D06     | TRAFOLITE           | BLACK LETTERS<br>ON WHITE BACKGROUND | 50X15mm    | 4mm         |
| U22.5001   | U22.5001<br>IS-1                  | ALUMINUM PAPER FOIL | BLACK LETTERS                        | 50X10mm    | 3mm         |
| U22.5002   | U22.5002<br>IS-2                  | ALUMINUM PAPER FOIL | BLACK LETTERS                        | 50X10mm    | 3mm         |
| U22.5003   | U22.5003<br>IS-3                  | ALUMINUM PAPER FOIL | BLACK LETTERS                        | 50X10mm    | 3mm         |
| U26.101    | U26.101<br>748F-1/D02             | ALUMINUM PAPER FOIL | BLACK LETTERS                        | 50X10mm    | 3mm         |
| U26.301    | U26.301<br>748F-1/D06             | ALUMINUM PAPER FOIL | BLACK LETTERS                        | 50X10mm    | 3mm         |
| U37.5001   | U37.5001<br>DC SUPPLY MCB FOR D02 | TRAFOLITE           | BLACK LETTERS<br>ON WHITE BACKGROUND | 50X15mm    | 4mm         |
| U37.5002   | U37.5002<br>DC SUPPLY MCB FOR D04 | TRAFOLITE           | BLACK LETTERS<br>ON WHITE BACKGROUND | 50X15mm    | 4mm         |
| U37.5003   | U37.5003<br>DC SUPPLY MCB FOR D06 | TRAFOLITE           | BLACK LETTERS<br>ON WHITE BACKGROUND | 50X15mm    | 4mm         |
| U37.5004   | U37.5004<br>C01-127V.C02-220V     | TRAFOLITE           | BLACK LETTERS<br>ON WHITE BACKGROUND | 50X15mm    | 4mm         |
| U37.5005   | U37.5005<br>IJ                    | TRAFOLITE           | BLACK LETTERS<br>ON WHITE BACKGROUND | 50X15mm    | 4mm         |
|            |                                   |                     |                                      |            |             |
|            |                                   |                     |                                      |            |             |

AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **11131113/00** JOB ORDER NO. **S-13656**

|          |       |                 |   |
|----------|-------|-----------------|---|
| 01       | 13 49 | FACTORY ASBUILT | DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b>           |
| 00       | 13 05 | FOR APPROVAL    | DATE STARTED <b>28.01.2013</b> DATE COMPLETED _____ |
| REV. NO. | DATE  | DESCRIPTION     | OPRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b>  |

| LIST OF APPARATUS                                 |                     |
|---|---------------------|
| <b>132KV BUSBAR PROTN.MAIN-1 BU PANEL +88P1-5</b> |                     |
| <b>S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b>     |                     |
| <b>RIYADH</b>                                     | <b>SAUDI ARABIA</b> |

|                              |           |                  |           |
|------------------------------|-----------|------------------|-----------|
| الشركة الوطنية لنقل الكهرباء |           | نقل الكهرباء     |           |
|                              |           | National Grid sa |           |
| INDEX                        | PLANT NO. | DRAWING NUMBER   | SHEET NO. |
| -                            | C421      | CD-322998        | L06 L07   |
|                              |           | REV. NO.         | 01        |

|                              |   |                 |                          |   |                       |   |  |   |   |  |                              |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
|------------------------------|---|-----------------|--------------------------|---|-----------------------|---|--|---|---|--|------------------------------|--|--|--------------------------|--|-----------------------|--|-------------------|--|--|--|--|----|-------|-----------------|--------------|--|----------------|--|--|--|--|-------|-----------|----|-------|--------------|-------------------------|--|----------------------|--|--|--|--|----------------|-----------|----------|------|-------------|------------------|--|---------------------|--|---------------------|--|--|--------|-----------|--|--|--|--|--|--|--|--|--|--|----------|----|
|                              | 1   | 2               | 3                        | 4 | 5                     | 6 | 7  | 8 | 9 | 10   |                              |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
| A                            |   |                 |                          |   |                       |   |  |   |   |  |                              |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
| B                            |   |                 |                          |   |                       |   |  |   |   |  |                              |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
| C                            |   |                 |                          |   |                       |   |  |   |   |  |                              |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
| D                            |   |                 |                          |   |                       |   |  |   |   |  |                              |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
| E                            |   |                 |                          |   |                       |   |  |   |   |  |                              |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
| F                            |   |                 |                          |   |                       |   |  |   |   |  |                              |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
| G                            | <table><tr><td colspan="3">AS-BUILT BY _____ DATE _____</td><td colspan="2">CONTRACT NO. 11131113/00</td><td colspan="2">JOB ORDER NO. S-13656</td><td colspan="3">LIST OF APPARATUS</td><td colspan="2">الشركة الوطنية لنقل الكهرباء<br/>National Grid sa</td></tr><tr><td>01</td><td>13 49</td><td>FACTORY ASBUILT</td><td colspan="2">DRAWN BY RIZ</td><td colspan="2">CHECKED BY KVR</td><td colspan="3">132KV BUSBAR PROTN.MAIN-1 BU PANEL +B8P1-5</td><td>INDEX</td><td>PLANT NO.</td></tr><tr><td>00</td><td>13 05</td><td>FOR APPROVAL</td><td colspan="2">DATE STARTED 28.01.2013</td><td colspan="2">DATE COMPLETED _____</td><td colspan="3">S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</td><td>DRAWING NUMBER</td><td>SHEET NO.</td></tr><tr><td>REV. NO.</td><td>DATE</td><td>DESCRIPTION</td><td colspan="2">OPRG. DEPT. CTPD</td><td colspan="2">ENG. DEPT. AUT-PSAC</td><td colspan="3">RIYADH SAUDI ARABIA</td><td>- C421</td><td>CD-322998</td></tr><tr><td colspan="10"></td><td>REV. NO.</td><td>01</td></tr></table> |                 |                          |   |                       |   |  |   |   |  | AS-BUILT BY _____ DATE _____ |  |  | CONTRACT NO. 11131113/00 |  | JOB ORDER NO. S-13656 |  | LIST OF APPARATUS |  |  | الشركة الوطنية لنقل الكهرباء<br>National Grid sa |  | 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ |  | CHECKED BY KVR |  | 132KV BUSBAR PROTN.MAIN-1 BU PANEL +B8P1-5 |  |  | INDEX | PLANT NO. | 00 | 13 05 | FOR APPROVAL | DATE STARTED 28.01.2013 |  | DATE COMPLETED _____ |  | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY |  |  | DRAWING NUMBER | SHEET NO. | REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD |  | ENG. DEPT. AUT-PSAC |  | RIYADH SAUDI ARABIA |  |  | - C421 | CD-322998 |  |  |  |  |  |  |  |  |  |  | REV. NO. | 01 |
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| 01                           | 13 49   | FACTORY ASBUILT | DRAWN BY RIZ             |   | CHECKED BY KVR        |   | 132KV BUSBAR PROTN.MAIN-1 BU PANEL +B8P1-5 |   |   | INDEX  | PLANT NO.                    |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
| 00                           | 13 05   | FOR APPROVAL    | DATE STARTED 28.01.2013  |   | DATE COMPLETED _____  |   | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY     |   |   | DRAWING NUMBER                                   | SHEET NO.                    |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
| REV. NO.                     | DATE  | DESCRIPTION     | OPRG. DEPT. CTPD         |   | ENG. DEPT. AUT-PSAC   |   | RIYADH SAUDI ARABIA                        |   |   | - C421   | CD-322998                    |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |
|                              |   |                 |                          |   |                       |   |  |   |   | REV. NO.   | 01                           |  |  |                          |  |                       |  |                   |  |  |  |  |    |       |                 |              |  |                |  |  |  |  |       |           |    |       |              |                         |  |                      |  |  |  |  |                |           |          |      |             |                  |  |                     |  |                     |  |  |        |           |  |  |  |  |  |  |  |  |  |  |          |    |

NG/D2-D (2012/01)  
VECTOR NGD200

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POWER SYSTEMS NETWORK MANAGEMENT  
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS  
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.  
414, AL-KHARJ ROAD  
SECOND INDUSTRIAL CITY  
RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company  
CLIENT : National Gridsa  
PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY  
SUBSTATION : S/S 8709  
CONTRACT NO. : 11131113/00  
TITLE : SCHEMATICS DRAWINGS - +BBP1-5  
[132KV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL]

AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **11131113/00** JOB ORDER NO. **S-13656**

|    |       |                 |
|----|-------|-----------------|
| 01 | 13 49 | FACTORY ASBUILT |
| 00 | 13 05 | FOR APPROVAL    |

DRAWN BY **RIZ** CHECKED BY **KVR**

DATE STARTED **28.01.2013** DATE COMPLETED \_\_\_\_\_

OPRG. DEPT. **CTPD** ENG. DEPT. **AUT-PSAC**

### COVER SHEET

**132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBP1-5**

**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**

**RIYADH**

**SAUDI ARABIA**

الشركة الوطنية لنقل الكهرباء



نقل الكهرباء  
National Grid sa

| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO.         | REV. NO. |
|-------|-----------|----------------|-------------------|----------|
| -     | C421      | CD-322999      | SHT 000 CONT. 001 | 01       |

NG/D2-D (2012/01)

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VECTOR

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LIGHTING, HEATER & SOCKET ALARM CKT. | 212 | X | X |  | DC SUPPLY DISTRIBUTION | 216 | X | X |  | CURRENT TRANSFORMER INPUTS -87B+50BF-1/BU-D02 | 221 | X | X |  | CURRENT TRANSFORMER INPUTS -87B+50BF-1/BU-D04 | 222 | X | X |  | CURRENT TRANSFORMER INPUTS -87B+50BF-1/BU-D06 | 223 | X | X |  | 87B+50BF-1/BU-D02 PROTN.RELAY-BINARY INPUTS | 231 | X | X |  | 87B+50BF-1/BU-D02 PROTN.RELAY-BINARY INPUTS | 232 | X | X |  | CBF-1 & BUSBAR PROTN-1 TRIP RELAY CIRCUIT | 233 | X | X |  | 87B+50BF-1/BU-D04 PROTN.RELAY-BINARY INPUTS | 234 | X | X |  | 87B+50BF-1/BU-D04 PROTN.RELAY-BINARY INPUTS | 235 | X | X |  | CBF-1 & BUSBAR PROTN-1 TRIP RELAY CIRCUIT | 236 | X | X |  | 87B+50BF-1/BU-D06 PROTN.RELAY-BINARY INPUTS | 237 | X | X |  | 87B+50BF-1/BU-D06 PROTN.RELAY-BINARY INPUTS | 238 | X | X |  | CBF-1 & BUSBAR PROTN-1 TRIP RELAY CIRCUIT | 239 | X | X |  |  |  |  |  |  |  |  |  |  |  | <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:30%;">CONTENTS</th> <th style="width:10%;">ABB<br/>SHT.NO.</th> <th style="width:10%;">REV.00</th> <th style="width:10%;">REV.01</th> <th style="width:10%;">REV.02</th> </tr> <tr><td>COMMON ALARM CIRCUITS</td><td>292</td><td>X</td><td>X</td><td></td></tr> <tr><td>BLOCK REFERENCE 87B+50BF-1/BU-D02</td><td>293</td><td>X</td><td>X</td><td></td></tr> <tr><td>BLOCK REFERENCE 87B+50BF-1/BU-D02</td><td>294</td><td>X</td><td>X</td><td></td></tr> <tr><td>BLOCK REFERENCE 87B+50BF-1/BU-D04</td><td>295</td><td>X</td><td>X</td><td></td></tr> <tr><td>BLOCK REFERENCE 87B+50BF-1/BU-D04</td><td>296</td><td>X</td><td>X</td><td></td></tr> <tr><td>BLOCK REFERENCE 87B+50BF-1/BU-D06</td><td>297</td><td>X</td><td>X</td><td></td></tr> <tr><td>BLOCK REFERENCE 87B+50BF-1/BU-D06</td><td>298</td><td>X</td><td>X</td><td></td></tr> <tr><td>TERMINAL BLOCKS REFERENCE</td><td>301</td><td>X</td><td>X</td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td></tr> </table> |  |  |  |  | CONTENTS | ABB<br>SHT.NO. | REV.00 | REV.01 | REV.02 | COMMON ALARM CIRCUITS | 292 | X | X |  | BLOCK REFERENCE 87B+50BF-1/BU-D02 | 293 | X | X |  | BLOCK REFERENCE 87B+50BF-1/BU-D02 | 294 | X | X |  | BLOCK REFERENCE 87B+50BF-1/BU-D04 | 295 | X | X |  | BLOCK REFERENCE 87B+50BF-1/BU-D04 | 296 | X | X |  | BLOCK REFERENCE 87B+50BF-1/BU-D06 | 297 | X | X |  | BLOCK REFERENCE 87B+50BF-1/BU-D06 | 298 | X | X |  | TERMINAL BLOCKS REFERENCE | 301 | X | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CONTENTS                                      |   |        |        |        |   | ABB<br>SHT.NO. | REV.00         | REV.01 | REV.02 |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COVER SHEET                                   |   |        |        |        |   | 000            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CONTENTS SHEET                                |   |        |        |        |   | 001            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GRAPHICAL SYMBOLS FOR DIAGRAMS                |   |        |        |        |   | 011            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GRAPHICAL SYMBOLS FOR DIAGRAMS                |   |        |        |        |   | 012            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COMMON LEGEND                                 |   |        |        |        |   | 013            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FERRULE AND WIRING DETAILS                    |   |        |        |        |   | 014            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DRAWING REFERENCES                            |   |        |        |        |   | 015            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DRAWING REFERENCES                            |   |        |        |        |   | 016            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PRIMARY SYSTEM                                |   |        |        |        |   | 051-056        | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| AC SUPPLY FOR ILLUMINATION & POWER SOCKET     |   |        |        |        |   | 211            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CUB. LIGHTING, HEATER & SOCKET ALARM CKT.     |   |        |        |        |   | 212            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DC SUPPLY DISTRIBUTION                        |   |        |        |        |   | 216            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CURRENT TRANSFORMER INPUTS -87B+50BF-1/BU-D02 |   |        |        |        |   | 221            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CURRENT TRANSFORMER INPUTS -87B+50BF-1/BU-D04 |   |        |        |        |   | 222            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CURRENT TRANSFORMER INPUTS -87B+50BF-1/BU-D06 |   |        |        |        |   | 223            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 87B+50BF-1/BU-D02 PROTN.RELAY-BINARY INPUTS   |   |        |        |        |   | 231            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 87B+50BF-1/BU-D02 PROTN.RELAY-BINARY INPUTS   |   |        |        |        |   | 232            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CBF-1 & BUSBAR PROTN-1 TRIP RELAY CIRCUIT     |   |        |        |        |   | 233            | X              | X      |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 87B+50BF-1/BU-D04 PROTN.RELAY-BINARY INPUTS   | 234   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 87B+50BF-1/BU-D04 PROTN.RELAY-BINARY INPUTS   | 235   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CBF-1 & BUSBAR PROTN-1 TRIP RELAY CIRCUIT     | 236   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 87B+50BF-1/BU-D06 PROTN.RELAY-BINARY INPUTS   | 237   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 87B+50BF-1/BU-D06 PROTN.RELAY-BINARY INPUTS   | 238   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CBF-1 & BUSBAR PROTN-1 TRIP RELAY CIRCUIT     | 239   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CONTENTS                                      | ABB<br>SHT.NO.  | REV.00 | REV.01 | REV.02 |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COMMON ALARM CIRCUITS                         | 292   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| BLOCK REFERENCE 87B+50BF-1/BU-D02             | 293   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| BLOCK REFERENCE 87B+50BF-1/BU-D02             | 294   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| BLOCK REFERENCE 87B+50BF-1/BU-D04             | 295   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| BLOCK REFERENCE 87B+50BF-1/BU-D04             | 296   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| BLOCK REFERENCE 87B+50BF-1/BU-D06             | 297   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| BLOCK REFERENCE 87B+50BF-1/BU-D06             | 298   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TERMINAL BLOCKS REFERENCE                     | 301   | X      | X      |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| B   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| D   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| E   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| F   |   |        |        |        |   |                |                |        |        |        |             |     |   |   |  |                |     |   |   |  |                                |     |   |   |  |                                |     |   |   |  |               |     |   |   |  |                            |     |   |   |  |                    |     |   |   |  |                    |     |   |   |  |                |         |   |   |  |   |     |   |   |  |   |     |   |   |  |                        |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |   |     |   |   |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |          |                |        |        |        |                       |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                                   |     |   |   |  |                           |     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|                              |       |                                 |   |                              |   |                       |  |  |       |           |                |           |          |
|------------------------------|-------|---------------------------------|---|------------------------------|---|-----------------------|--|--|-------|-----------|----------------|-----------|----------|
| AS-BUILT BY _____ DATE _____ |       | CONTRACT NO. <b>11131113/00</b> |   | JOB ORDER NO. <b>S-13656</b> |   | <b>CONTENTS SHEET</b> |  | نقل الكهرباء<br>الشركة الوطنية لنقل الكهرباء<br>National Grid sa |       |           |                |           |          |
| 01                           | 13 49 | FACTORY ASBUILT                 | DRAWN BY <b>RIZ</b>                                 | CHECKED BY <b>KVR</b>        | <b>132KV BUSBAR PROTN.MAIN-1 BU PANEL +88P1-5</b><br><b>S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b><br><b>RIYADH</b> |                       |  |  | INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | REV. NO. |
| 00                           | 13 05 | FOR APPROVAL                    | DATE STARTED <b>28.01.2013</b> DATE COMPLETED _____ |                              |   |                       |  |  | -     | C421      | CD-322999      | SHT       | CONT.    |
| REV. NO.                     | DATE  | DESCRIPTION                     | OPRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b>  |                              | SAUDI ARABIA  |                       |  |  |       |           |                |           |          |

|   |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A |   |   |   |   |   |   |   |   |    |
| B |   |   |   |   |   |   |   |   |    |
| C |   |   |   |   |   |   |   |   |    |
| D |   |   |   |   |   |   |   |   |    |
| E |   |   |   |   |   |   |   |   |    |
| F |   |   |   |   |   |   |   |   |    |
| G |   |   |   |   |   |   |   |   |    |

| SYMBOL | DESCRIPTION   | SYMBOL | DESCRIPTION  | SYMBOL | DESCRIPTION   |
|--------|---|--------|--|--------|---|
|        | FRAME CONNECTION  |        | MAIN CONTACT OF A CIRCUIT BREAKER PASSING MAKE CONTACT CLOSING MOMENTARILY DURING OPERATION AND RELEASE    |        | RELAY WITH TWO MAKE CONTACTS, ONE OF THEM DELAYED WHEN OPERATING                      |
|        | EARTH CONNECTION  |        | BREAK CONTACT DELAYED WHEN OPERATING   |        | RELAY WITH TWO ACTUATORS AND A TWO STABLE POSITIONS                                   |
|        | RESISTOR  |        | MAKE CONTACT DELAYED WHEN RELEASING  |        | TWO MECHANICAL LINKS CROSSING WITHOUT CONNECTION                                      |
|        | VARIABLE RESISTOR   |        | JUNCTION OF MECHANICAL LINKS   |        | AUTOMATIC RESET   |
|        | RESISTOR WITH PRESET ADJUSTMENT                                     |        | NON-AUTOMATIC RESET  |        | MECHANICAL INDICATOR WITH AUTOMATIC RESET   |
|        | CAPACITOR   |        | SWITCHING DEVICE WITH MANUAL OPERATION AND WITH AUTOMATIC RESET  |        | MECHANICAL INDICATOR WITH NON-AUTOMATIC RESET   |
|        | SEMICONDUCTOR DIODE USED AS A CAPACITIVE DEVICE                     |        | SWITCHING DEVICE WITH MANUAL OPERATION AND WITH NON-AUTOMATIC RESET  |        | ELECTRICALLY CONTROLLED MECHANICAL INDICATOR WITH AUTOMATIC RESET                     |
|        | OPEN CONTACT, MAKE CONTACT  |        | CHANGE-OVER SWITCHING DEVICE WITH MANUAL CONTROL AUTOMATIC RESET FROM POSITION 1-2 TO THE NEUTRAL POSITION |        | ELECTRICALLY CONTROLLED MECHANICAL INDICATOR WITH NON-AUTOMATIC RESET                 |
|        | CLOSED CONTACT, BREAK CONTACT                                       |        | RELAY WITH MAKE CONTACT  |        | RELAY WITH MECHANICAL INDICATOR   |
|        | CHANGE-OVER CONTACT, BREAK BEFORE MAKE                              |        | RELAY WITH CHANGE-OVER CONTACT   |        | ELECTRO-MECHANICAL POSITION INDICATOR WITH ONE DE-ENERGIZED AND ONE OPERATED POSITION |
|        | MAKE CONTACT WHICH IS EARLY WHEN OPERATING AND LATE WHEN RELEASING  |        | RELAY WITH MAKE CONTACT, DELAYED WHEN OPERATING  |        | ELECTRO-MECHANICAL POSITION INDICATOR WITH ONE DE-ENERGIZED AND TWO OPERATED POSITION |
|        | BREAK CONTACT WHICH IS LATE WHEN OPERATING AND EARLY WHEN RELEASING |        | RELAY WITH MAKE CONTACT, DELAYED WHEN RELEASING  |        | BELL, BUZZER  |
|        | SWITCHING DEVICE WITH MANUAL CONTROL                                |        | RELAY WITH MAKE CONTACT, DELAYED WHEN OPERATING AND RELEASING  |        | SIREN , HORN  |
|        | MAKE CONTACT DELAYED WHEN OPERATING                                 |        |  |        |   |
|        | BREAK CONTACT DELAYED WHEN RELEASING                                |        |  |        |   |
|        | MAKE CONTACT DELAYED WHEN OPERATING AND RELEASING                   |        |  |        |   |
|        | MAIN CONTACT OF A SWITCH DISCONNECTOR                               |        |  |        |   |
|        | MAIN CONTACT OF A DISCONNECTOR                                      |        |  |        |   |

|                                     |  |  |  |  |  |  |  |                              |  |
|-------------------------------------|--|--|--|--|--|--|--|------------------------------|--|
| AS-BUILT BY _____ DATE _____        |  | CONTRACT NO. 11131113/00                     |  | JOB ORDER NO. S-13656                      |  | GRAPHICAL SYMBOLS FOR DIAGRAMS         |  | الشركة الوطنية لنقل الكهرباء |  |
| DRAWN BY RIZ CHECKED BY KVR         |  | DATE STARTED 28.01.2013 DATE COMPLETED _____ |  | 132KV BUSBAR PROTN.MAIN-1 BU PANEL +8BP1-5 |  | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY |  | National Grid sa             |  |
| PRG. DEPT. CTPD ENG. DEPT. AUT-PSAC |  | R/ADH SAUDI ARABIA                           |  | INDEX -                                    |  | PLANT NO. C421                         |  | DRAWING NUMBER CD-322999     |  |
| REV. NO. 00                         |  | DATE 13 05                                   |  | DESCRIPTION                                |  | SHT 011                                |  | CONT. 012                    |  |



|  | 1   | 2               | 3   | 4      | 5  | 6 | 7  | 8 | 9                            | 10        |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|--|---|-----------------|---|--------|--|---|--|---|------------------------------|-----------|------------------------------|-------------|--------|--------------------------|--------|-----------------------|--|--------------------------------|--|------------------------------|--|---------------------------------------|-------|-------------------------------------|--------------|----------|----------------|---|--|---|------------------|--------------------|----|-------------------------------|--------------|-------------------------|--------------------|----------------------|-----------------------------|--|---|-------|--------------|----------|----------------------------|-------------|--|--|---------------------|--|--|--|---|---------------------|--|--|--|---|--|------------|--|--|--|--|--|-----------------|--|--|--|--|---|--|------------------------------------|--|---|--|---------------------------|--|---------|--|--------|--|-----------------------------------|--|------------------------------|-----------|------------------|--|------------------------------------|--|-----------------------------|--|------------------|--|----------------------------|--|------------------|----|-----------|--|------------------------------------|--|--|--|---------|--|-------------------------------|--|--|
| A  |   |                 |   |        |  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
| B  |   |                 |   |        |  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
| C  |   |                 |   |        |  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
| D  |   |                 |   |        |  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
| E  |   |                 |   |        |  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
| F  |   |                 |   |        |  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
| <table><tr><th>SYMBOL</th><th>DESCRIPTION</th><th>SYMBOL</th><th>DESCRIPTION</th><th>SYMBOL</th><th>DESCRIPTION</th></tr><tr><td></td><td>FUSE / LINK</td><td></td><td>WATTMETER</td><td></td><td>ELEMENT WITH NEGATED INHIBITING INPUT</td></tr><tr><td></td><td>FUSE WITH THE SUPPLY SIDE INDICATED</td><td></td><td>VARMETER</td><td></td><td>ELEMENT WITH INPUT WHICH DOES NOT CARRY ANY LOGIC INFORMATION</td></tr><tr><td></td><td rowspan="2">SINGLE-PHASE TRANSFORMER WITH TWO SEPARATE WINDINGS (TWO ALTERNATIVE FORMS)</td><td></td><td>POWER FACTOR METER</td><td></td><td>ELEMENT WITH POSTPONED OUTPUT</td></tr><tr><td></td><td></td><td>POSITION INDICATOR</td><td></td><td>AND-ELEMENT WITH TWO INPUTS</td></tr><tr><td></td><td>SINGLE-PHASE TRANSFORMER WITH FERRO MAGNETIC CORE</td><td></td><td>SYNCHROSCOPE</td><td></td><td>OR-ELEMENT WITH TWO INPUTS</td></tr><tr><td></td><td rowspan="2">SINGLE-PHASE VOLTAGE TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION)</td><td></td><td>RECORDING VOLTMETER</td><td></td><td>LOGIC THRESHOLD ELEMENT WITH FOUR INPUTS AND THRESHOLD VALUE 2</td></tr><tr><td></td><td></td><td>RECORDING WATTMETER</td><td></td><td>ELEMENT WITH THREE INPUTS FOR "2 AND ONLY 2"</td></tr><tr><td></td><td>CURRENT TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION)</td><td></td><td>HOUR METER</td><td></td><td>EXCLUSIVE OR-ELEMENT WITH THREE INPUTS</td></tr><tr><td></td><td rowspan="2">CURRENT TRANSFORMER WITH TWO CORES (MULTI-LINE AND SINGLE-LINE REPRESENTATION)</td><td></td><td>WATT-HOUR METER</td><td></td><td>LOGIC IDENTITY ELEMENT WITH THREE INPUTS</td></tr><tr><td></td><td></td><td>WATT-HOUR METER FOR ENERGY FROM A BUSBAR SYSTEM</td><td></td><td>MAJORITY ELEMENT WITH THREE INPUTS</td></tr><tr><td></td><td>CURRENT TRANSFORMER WITH TWO SECONDARY WINDINGS ON ONE CORE (MULTI-LINE AND SINGLE-LINE REPRESENTATION)</td><td></td><td>ELEMENT WITH STATIC INPUT</td><td></td><td>NEGATOR</td></tr><tr><td></td><td>FILTER</td><td></td><td>ELEMENT WITH STATIC NEGATED INPUT</td><td></td><td>NAND ELEMENT WITH TWO INPUTS</td></tr><tr><td></td><td>HIGH-PASS FILTER</td><td></td><td>ELEMENT WITH STATIC NEGATED OUTPUT</td><td></td><td>NOR ELEMENT WITH TWO INPUTS</td></tr><tr><td></td><td>BAND-PASS FILTER</td><td></td><td>ELEMENT WITH DYNAMIC INPUT</td><td></td><td>BISTABLE ELEMENT</td></tr><tr><td></td><td>VOLTMETER</td><td></td><td>ELEMENT WITH DYNAMIC NEGATED INPUT</td><td></td><td></td></tr><tr><td></td><td>AMMETER</td><td></td><td>ELEMENT WITH INHIBITING INPUT</td><td></td><td></td></tr></table> |   |                 |   |        |  |   |  |   |                              |           | SYMBOL                       | DESCRIPTION | SYMBOL | DESCRIPTION              | SYMBOL | DESCRIPTION           |  | FUSE / LINK                    |  | WATTMETER                    |  | ELEMENT WITH NEGATED INHIBITING INPUT |       | FUSE WITH THE SUPPLY SIDE INDICATED |              | VARMETER |                | ELEMENT WITH INPUT WHICH DOES NOT CARRY ANY LOGIC INFORMATION |  | SINGLE-PHASE TRANSFORMER WITH TWO SEPARATE WINDINGS (TWO ALTERNATIVE FORMS) |                  | POWER FACTOR METER |    | ELEMENT WITH POSTPONED OUTPUT |              |                         | POSITION INDICATOR |                      | AND-ELEMENT WITH TWO INPUTS |  | SINGLE-PHASE TRANSFORMER WITH FERRO MAGNETIC CORE |       | SYNCHROSCOPE |          | OR-ELEMENT WITH TWO INPUTS |             | SINGLE-PHASE VOLTAGE TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION) |  | RECORDING VOLTMETER |  | LOGIC THRESHOLD ELEMENT WITH FOUR INPUTS AND THRESHOLD VALUE 2 |  |   | RECORDING WATTMETER |  | ELEMENT WITH THREE INPUTS FOR "2 AND ONLY 2" |  | CURRENT TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION) |  | HOUR METER |  | EXCLUSIVE OR-ELEMENT WITH THREE INPUTS |  | CURRENT TRANSFORMER WITH TWO CORES (MULTI-LINE AND SINGLE-LINE REPRESENTATION) |  | WATT-HOUR METER |  | LOGIC IDENTITY ELEMENT WITH THREE INPUTS |  |  | WATT-HOUR METER FOR ENERGY FROM A BUSBAR SYSTEM |  | MAJORITY ELEMENT WITH THREE INPUTS |  | CURRENT TRANSFORMER WITH TWO SECONDARY WINDINGS ON ONE CORE (MULTI-LINE AND SINGLE-LINE REPRESENTATION) |  | ELEMENT WITH STATIC INPUT |  | NEGATOR |  | FILTER |  | ELEMENT WITH STATIC NEGATED INPUT |  | NAND ELEMENT WITH TWO INPUTS |           | HIGH-PASS FILTER |  | ELEMENT WITH STATIC NEGATED OUTPUT |  | NOR ELEMENT WITH TWO INPUTS |  | BAND-PASS FILTER |  | ELEMENT WITH DYNAMIC INPUT |  | BISTABLE ELEMENT |    | VOLTMETER |  | ELEMENT WITH DYNAMIC NEGATED INPUT |  |  |  | AMMETER |  | ELEMENT WITH INHIBITING INPUT |  |  |
| SYMBOL   | DESCRIPTION   | SYMBOL          | DESCRIPTION                                     | SYMBOL | DESCRIPTION  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | FUSE / LINK   |                 | WATTMETER                                       |        | ELEMENT WITH NEGATED INHIBITING INPUT                          |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | FUSE WITH THE SUPPLY SIDE INDICATED   |                 | VARMETER  |        | ELEMENT WITH INPUT WHICH DOES NOT CARRY ANY LOGIC INFORMATION  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | SINGLE-PHASE TRANSFORMER WITH TWO SEPARATE WINDINGS (TWO ALTERNATIVE FORMS)   |                 | POWER FACTOR METER                              |        | ELEMENT WITH POSTPONED OUTPUT                                  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  |   |                 | POSITION INDICATOR                              |        | AND-ELEMENT WITH TWO INPUTS                                    |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | SINGLE-PHASE TRANSFORMER WITH FERRO MAGNETIC CORE   |                 | SYNCHROSCOPE                                    |        | OR-ELEMENT WITH TWO INPUTS                                     |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | SINGLE-PHASE VOLTAGE TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION)  |                 | RECORDING VOLTMETER                             |        | LOGIC THRESHOLD ELEMENT WITH FOUR INPUTS AND THRESHOLD VALUE 2 |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  |   |                 | RECORDING WATTMETER                             |        | ELEMENT WITH THREE INPUTS FOR "2 AND ONLY 2"                   |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | CURRENT TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION)   |                 | HOUR METER                                      |        | EXCLUSIVE OR-ELEMENT WITH THREE INPUTS                         |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | CURRENT TRANSFORMER WITH TWO CORES (MULTI-LINE AND SINGLE-LINE REPRESENTATION)  |                 | WATT-HOUR METER                                 |        | LOGIC IDENTITY ELEMENT WITH THREE INPUTS                       |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  |   |                 | WATT-HOUR METER FOR ENERGY FROM A BUSBAR SYSTEM |        | MAJORITY ELEMENT WITH THREE INPUTS                             |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | CURRENT TRANSFORMER WITH TWO SECONDARY WINDINGS ON ONE CORE (MULTI-LINE AND SINGLE-LINE REPRESENTATION)   |                 | ELEMENT WITH STATIC INPUT                       |        | NEGATOR  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | FILTER  |                 | ELEMENT WITH STATIC NEGATED INPUT               |        | NAND ELEMENT WITH TWO INPUTS                                   |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | HIGH-PASS FILTER  |                 | ELEMENT WITH STATIC NEGATED OUTPUT              |        | NOR ELEMENT WITH TWO INPUTS                                    |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | BAND-PASS FILTER  |                 | ELEMENT WITH DYNAMIC INPUT                      |        | BISTABLE ELEMENT   |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | VOLTMETER   |                 | ELEMENT WITH DYNAMIC NEGATED INPUT              |        |  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  | AMMETER   |                 | ELEMENT WITH INHIBITING INPUT                   |        |  |   |  |   |                              |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
| G  | <table><tr><td colspan="3">AS-BUILT BY _____ DATE _____</td><td colspan="2">CONTRACT NO. 11131113/00</td><td colspan="2">JOB ORDER NO. S-13656</td><td colspan="2">GRAPHICAL SYMBOLS FOR DIAGRAMS</td><td colspan="2">الشركة الوطنية لنقل الكهرباء</td></tr><tr><td>01</td><td>13 49</td><td>FACTORY ASBUILT</td><td colspan="2">DRAWN BY RIZ</td><td colspan="2">CHECKED BY KVR</td><td colspan="2">132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBPI-5</td><td colspan="2">National Grid sa</td></tr><tr><td>00</td><td>13 05</td><td>FOR APPROVAL</td><td colspan="2">DATE STARTED 28.01.2013</td><td colspan="2">DATE COMPLETED _____</td><td colspan="2">S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</td><td>INDEX</td><td>PLANT NO.</td></tr><tr><td>REV. NO.</td><td>DATE</td><td>DESCRIPTION</td><td colspan="2">OPRG. DEPT. CTPD</td><td colspan="2">ENG. DEPT. AUT-PSAC</td><td colspan="2">RIYADH SAUDI ARABIA</td><td>-</td><td>C421</td></tr><tr><td colspan="9"></td><td colspan="2">DRAWING NUMBER</td></tr><tr><td colspan="9"></td><td colspan="2">CD-322999</td></tr><tr><td colspan="9"></td><td>SHEET NO.</td><td>REV. NO.</td></tr><tr><td colspan="9"></td><td>012 013</td><td>01</td></tr></table> |                 |   |        |  |   |  |   |                              |           | AS-BUILT BY _____ DATE _____ |             |        | CONTRACT NO. 11131113/00 |        | JOB ORDER NO. S-13656 |  | GRAPHICAL SYMBOLS FOR DIAGRAMS |  | الشركة الوطنية لنقل الكهرباء |  | 01                                    | 13 49 | FACTORY ASBUILT                     | DRAWN BY RIZ |          | CHECKED BY KVR |   | 132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBPI-5 |   | National Grid sa |                    | 00 | 13 05                         | FOR APPROVAL | DATE STARTED 28.01.2013 |                    | DATE COMPLETED _____ |                             | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY |   | INDEX | PLANT NO.    | REV. NO. | DATE                       | DESCRIPTION | OPRG. DEPT. CTPD   |  | ENG. DEPT. AUT-PSAC |  | RIYADH SAUDI ARABIA  |  | - | C421                |  |  |  |   |  |            |  |  |  | DRAWING NUMBER   |  |                 |  |  |  |  |   |  |                                    |  | CD-322999   |  |                           |  |         |  |        |  |                                   |  |                              | SHEET NO. | REV. NO.         |  |                                    |  |                             |  |                  |  |                            |  | 012 013          | 01 |           |  |                                    |  |  |  |         |  |                               |  |  |
| AS-BUILT BY _____ DATE _____   |   |                 | CONTRACT NO. 11131113/00                        |        | JOB ORDER NO. S-13656  |   | GRAPHICAL SYMBOLS FOR DIAGRAMS             |   | الشركة الوطنية لنقل الكهرباء |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
| 01   | 13 49   | FACTORY ASBUILT | DRAWN BY RIZ                                    |        | CHECKED BY KVR   |   | 132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBPI-5 |   | National Grid sa             |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
| 00   | 13 05   | FOR APPROVAL    | DATE STARTED 28.01.2013                         |        | DATE COMPLETED _____   |   | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY     |   | INDEX                        | PLANT NO. |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
| REV. NO.   | DATE  | DESCRIPTION     | OPRG. DEPT. CTPD                                |        | ENG. DEPT. AUT-PSAC  |   | RIYADH SAUDI ARABIA                        |   | -                            | C421      |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  |   |                 |   |        |  |   |  |   | DRAWING NUMBER               |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  |   |                 |   |        |  |   |  |   | CD-322999                    |           |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  |   |                 |   |        |  |   |  |   | SHEET NO.                    | REV. NO.  |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |
|  |   |                 |   |        |  |   |  |   | 012 013                      | 01        |                              |             |        |                          |        |                       |  |                                |  |                              |  |                                       |       |                                     |              |          |                |   |  |   |                  |                    |    |                               |              |                         |                    |                      |                             |  |   |       |              |          |                            |             |  |  |                     |  |  |  |   |                     |  |  |  |   |  |            |  |  |  |  |  |                 |  |  |  |  |   |  |                                    |  |   |  |                           |  |         |  |        |  |                                   |  |                              |           |                  |  |                                    |  |                             |  |                  |  |                            |  |                  |    |           |  |                                    |  |  |  |         |  |                               |  |  |

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|---|---|---|---|---|---|---|---|---|---|----|
|   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A |   |   |   |   |   |   |   |   |   |    |
| B |   |   |   |   |   |   |   |   |   |    |
| C |   |   |   |   |   |   |   |   |   |    |
| D |   |   |   |   |   |   |   |   |   |    |
| E |   |   |   |   |   |   |   |   |   |    |
| F |   |   |   |   |   |   |   |   |   |    |

### LEGENDS

|              |  |
|--------------|--|
| ±R1          | DC SUPPLY - MAIN PROTECTION            |
| ±R2          | DC SUPPLY - SECONDARY PROTECTION       |
| ±R3          | DC SUPPLY - BACK UP PROTECTION         |
| ±IT          | DC SUPPLY - INTER TRIP                 |
| FL           | DC SUPPLY - FLASHING CIRCUIT           |
| BB RS±       | DC SUPPLY - BUS BAR - PROTECTION RESET |
| BB CBF±/CBF± | DC SUPPLY - CBF PROTECTION             |
|              |  |
| R            | RESET BUS - ALARM SYSTEM               |
| CR           | CONTROL ROOM                           |
| ECC          | ENERGY CONTROL CENTRE                  |
| LOCAL        | THE LOCATION OF CONTROLLED DEVICE      |
| REMOTE       | ANY OTHER LOCATION NOT LOCAL           |
|              |  |
| ON           | CB NORMALLY OPEN AUXILIARY CONTACT     |
| OFF          | CB NORMALLY CLOSED AUXILIARY CONTACT   |
| A            | COMMON                                 |
| T            | TEST POSITION                          |
| S            | SERVICE POSITION                       |
| CS           | CLOSE IN SERVICE POSITION              |
| CT           | CLOSE IN TEST POSITION                 |
| LS           | LOCAL SERVICE                          |
| LT           | LOCAL TEST                             |
| LC           | LOCAL CLOSE                            |
| LO           | LOCAL OPEN                             |
| RO           | REMOTE OPEN                            |
| OP           | OPERATE                                |
| RE           | RESET                                  |

### NOTES

#### LABELS

WHITE LABEL WITH BLACK LETTERING WILL BE PROVIDED FOR ALL MOUNTED APPARATUS EQUIPMENT IDENTIFICATION AND FUNCTION REFERENCE LABEL WILL BE PROVIDED FOR FRONT MOUNTED EQUIPMENTS OF THE PANEL AND EQUIPMENT IDENTIFICATION LABEL WILL BE PROVIDED FOR INTERNALLY MOUNTED EQUIPMENTS

#### WIRING

PVC INSULATED 600V GRADE  
2.5 SQ.mm. YELLOW COLOURED FOR CT CIRCUITS  
2.5 SQ.mm. RE COLOURED FOR VT CIRCUITS  
1.5 SQ.mm. GREY COLOURED FOR DC SUPPLY, SCADA AND CONTROL CIRCUITS  
2.5 SQ.mm. BLACK COLOURED FOR AVC AND AC CIRCUITS  
2.5 SQ.mm. YELLOW/GREEN COLOURED FOR EARTHING CONNECTIONS  
FOLLOWING MARKERS SHALL BE PROVIDED ON FOLLOWING WIRES:  
+ SIGN FOR DC + WIRE  
- SIGN FOR DC - WIRE

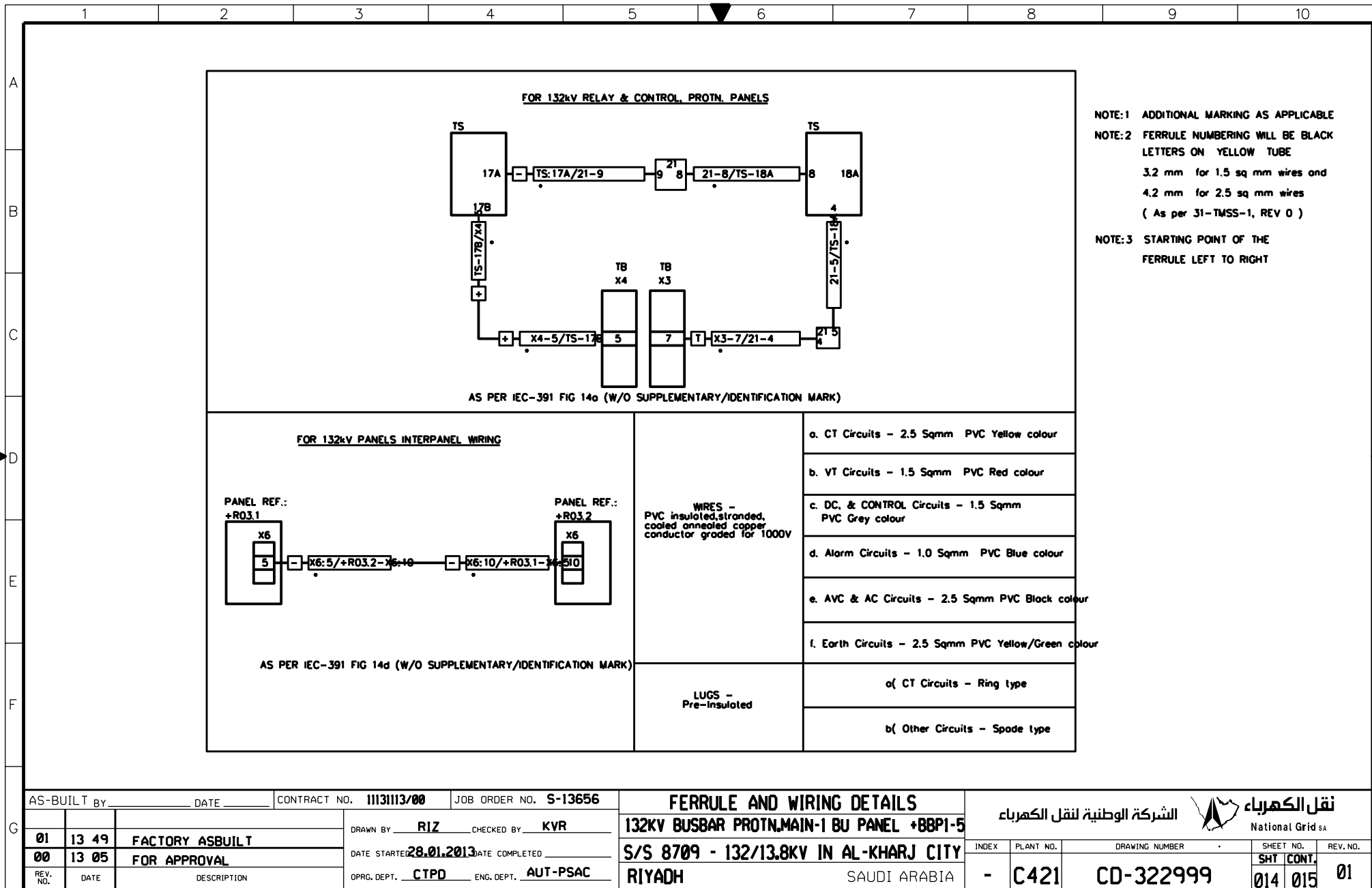
#### LUGS

A. CT CIRCUITS- RING TYPE  
B. OTHER CIRCUITS - SPADE TYPE

#### FERULLING

YELLO TUBE 3.2 mm FOR 1.5SQ mm WIRES AND 4.2 FOR 2.5 SQ mm WIRES  
( AS PER 31 - TMSS-1, RE.0 )

|                              |       |                                 |   |                              |   |                      |       |  |  |
|------------------------------|-------|---------------------------------|---|------------------------------|---|----------------------|-------|--|--|
| AS-BUILT BY _____ DATE _____ |       | CONTRACT NO. <b>11131113/00</b> |   | JOB ORDER NO. <b>S-13656</b> |   | <b>COMMON LEGEND</b> |       | <b>الشركة الوطنية لنقل الكهرباء</b><br><br><b>نقل الكهرباء</b><br>National Grid sa |  |
| 01                           | 13 49 | FACTORY ASBUILT                 | DRAWN BY <b>RIZ</b>                                 | CHECKED BY <b>KVR</b>        | 132KV BUSBAR PROT.N.MAIN-1 BU PANEL +8BP1-5 |                      | INDEX | PLANT NO.  | DRAWING NUMBER                               |
| 00                           | 13 05 | FOR APPROVAL                    | DATE STARTED <b>28.01.2013</b> DATE COMPLETED _____ |                              | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY      |                      | -     | C421   | CD-322999                                    |
| REV. NO.                     | DATE  | DESCRIPTION                     | OPRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b>  |                              | RIYADH SAUDI ARABIA                         |                      |       |  |  |
|                              |       |                                 |   |                              |   |                      |       |  | SHEET NO.<br>013 CONT.<br>014 REV. NO.<br>01 |

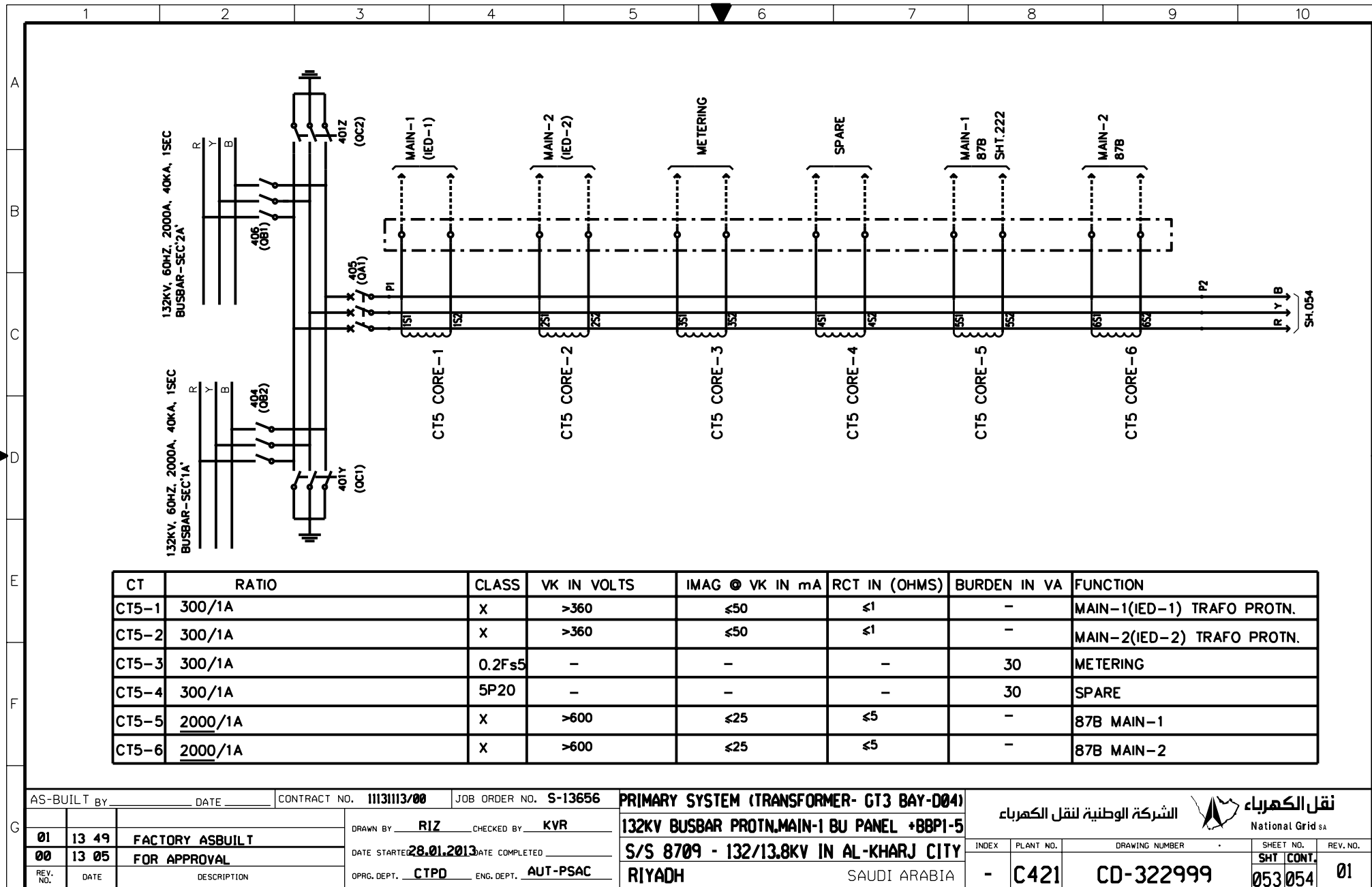






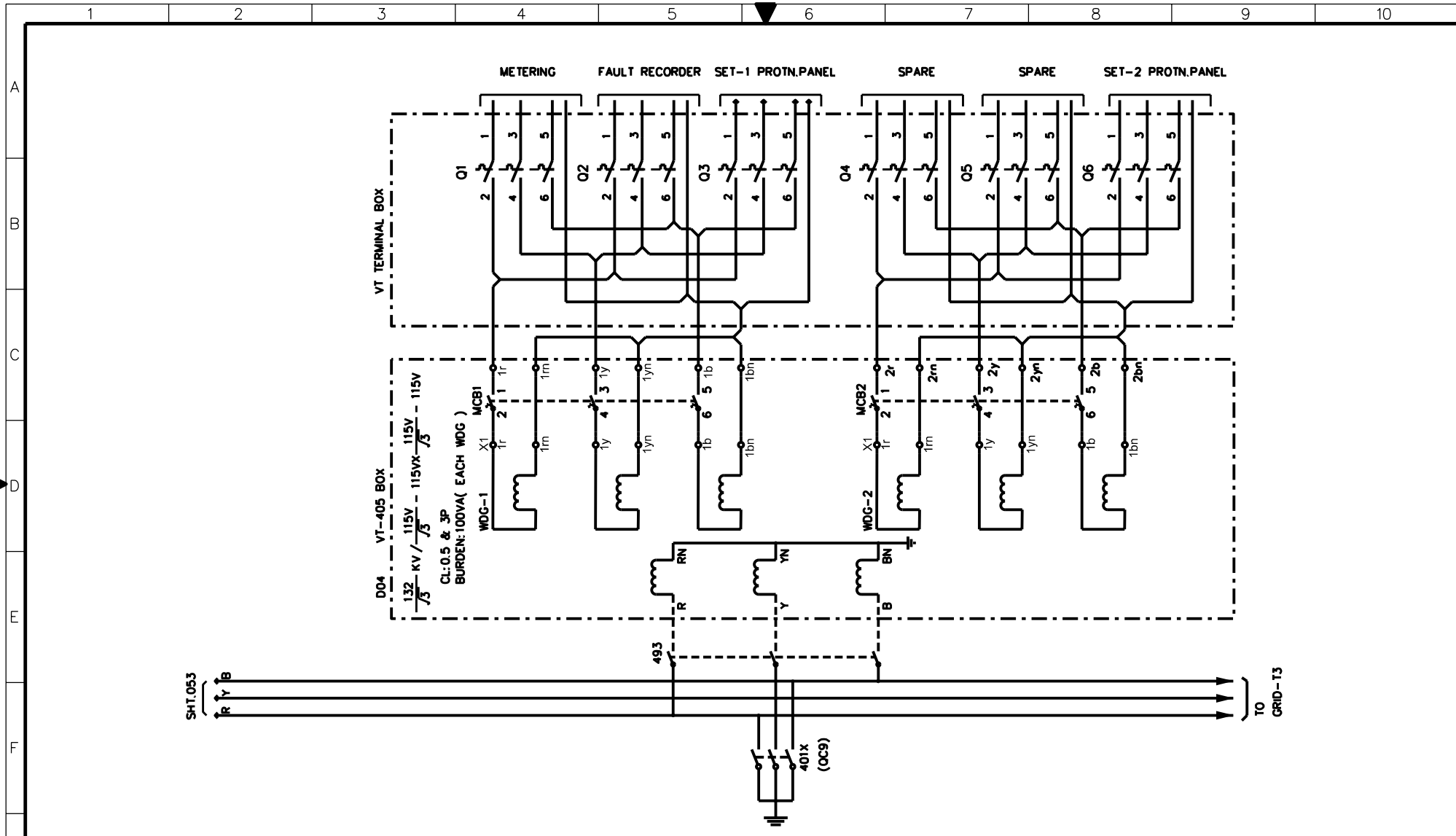






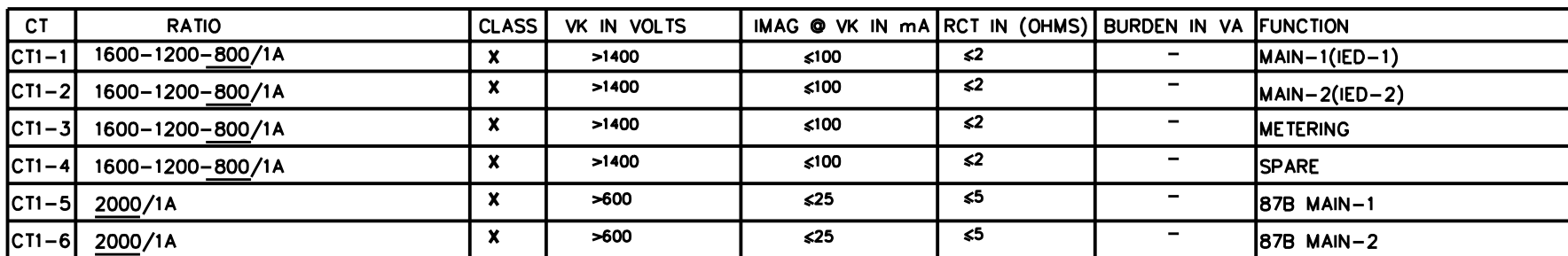
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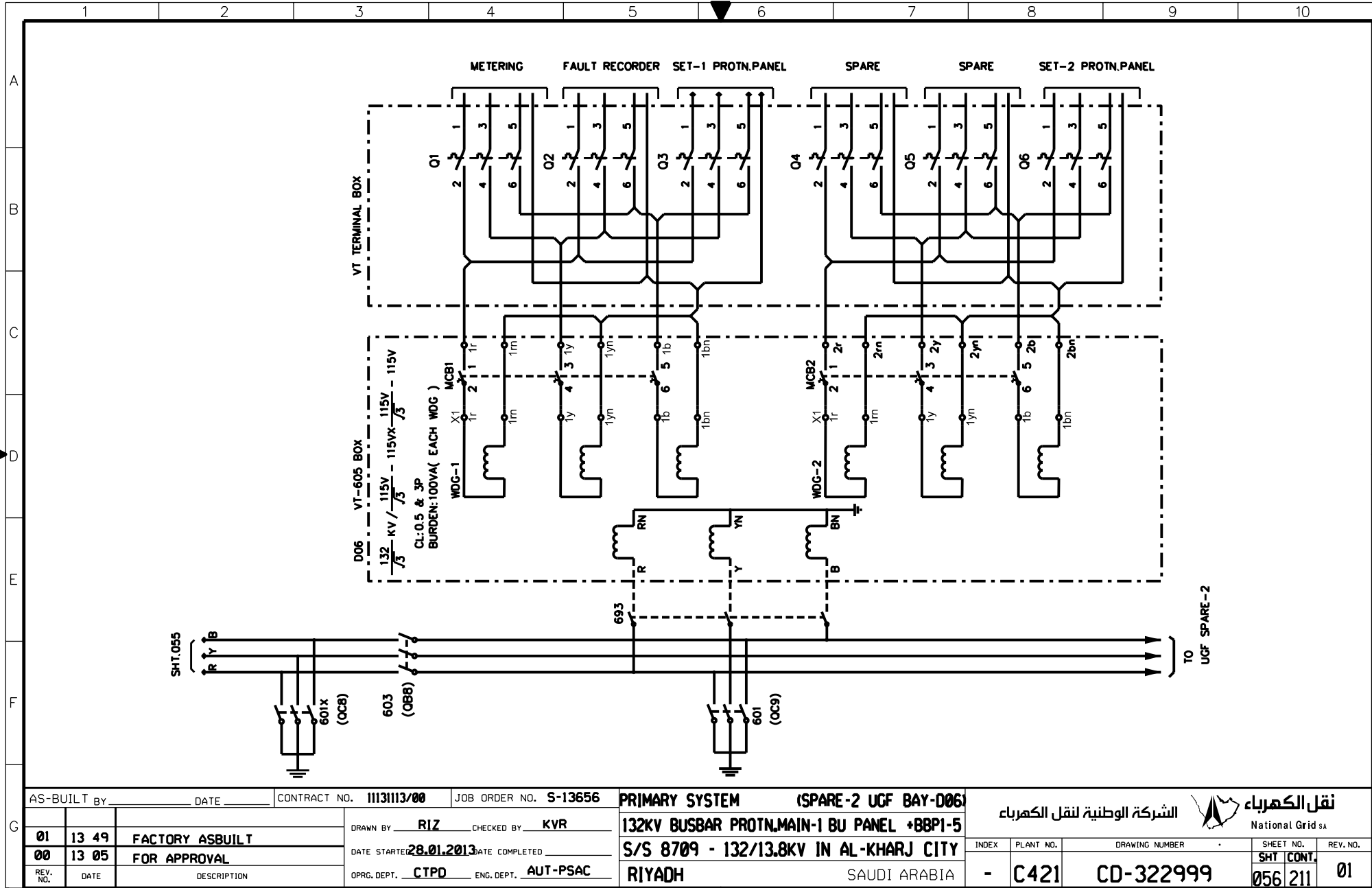


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|--|--|--|--|--|-----------------------|--|---|--|-------------------|--|--|--|
| AS-BUILT BY _____ DATE _____                 |  |  | CONTRACT NO. 11131113/00                   |  | JOB ORDER NO. S-13656 |  | PRIMARY SYSTEM (TRANSFORMER- GT3 BAY-D04) |  |                   |  |  |  |
| DRAWN BY RIZ CHECKED BY KVR                  |  |  | 132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBP1-5 |  |                       |  | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY    |  |                   |  |  |  |
| DATE STARTED 28.01.2013 DATE COMPLETED _____ |  |  | RIYADH                                     |  |                       |  | SAUDI ARABIA                              |  |                   |  |  |  |
| OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC         |  |  | INDEX -                                    |  | PLANT NO. C421        |  | DRAWING NUMBER CD-322999                  |  | SHEET NO. 054/055 |  |  |  |
| REV. NO. 00                                  |  |  | DATE 13 05                                 |  | DESCRIPTION           |  | FACTORY ASBUILT                           |  | FOR APPROVAL      |  |  |  |
| REV. NO. 01                                  |  |  | DATE 13 05                                 |  | DESCRIPTION           |  | FACTORY ASBUILT                           |  | FOR APPROVAL      |  |  |  |

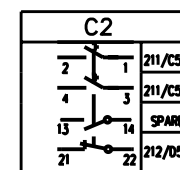
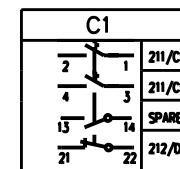
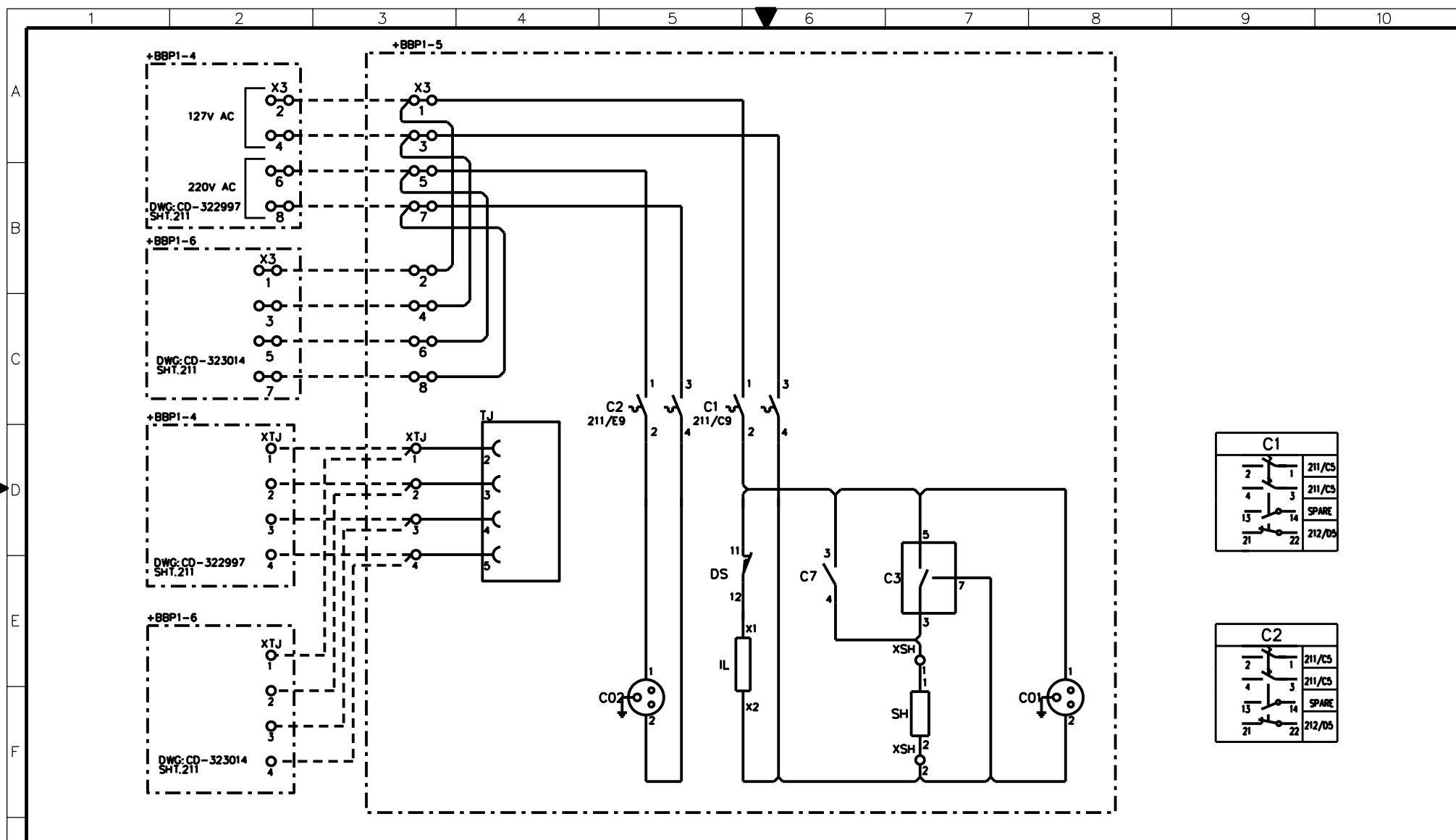
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|------------------------------|-----------|--|-----------------------------------|----------|
| الشركة الوطنية لنقل الكهرباء |           |  نقل الكهرباء<br>National Grid SA |                                   |          |
| DEX                          | PLANT NO. | DRAWING NUMBER   | SHEET NO.<br>SHT CONT.<br>055 056 | REV. NO. |
| -                            | C421      | CD-322999  |                                   | 01       |



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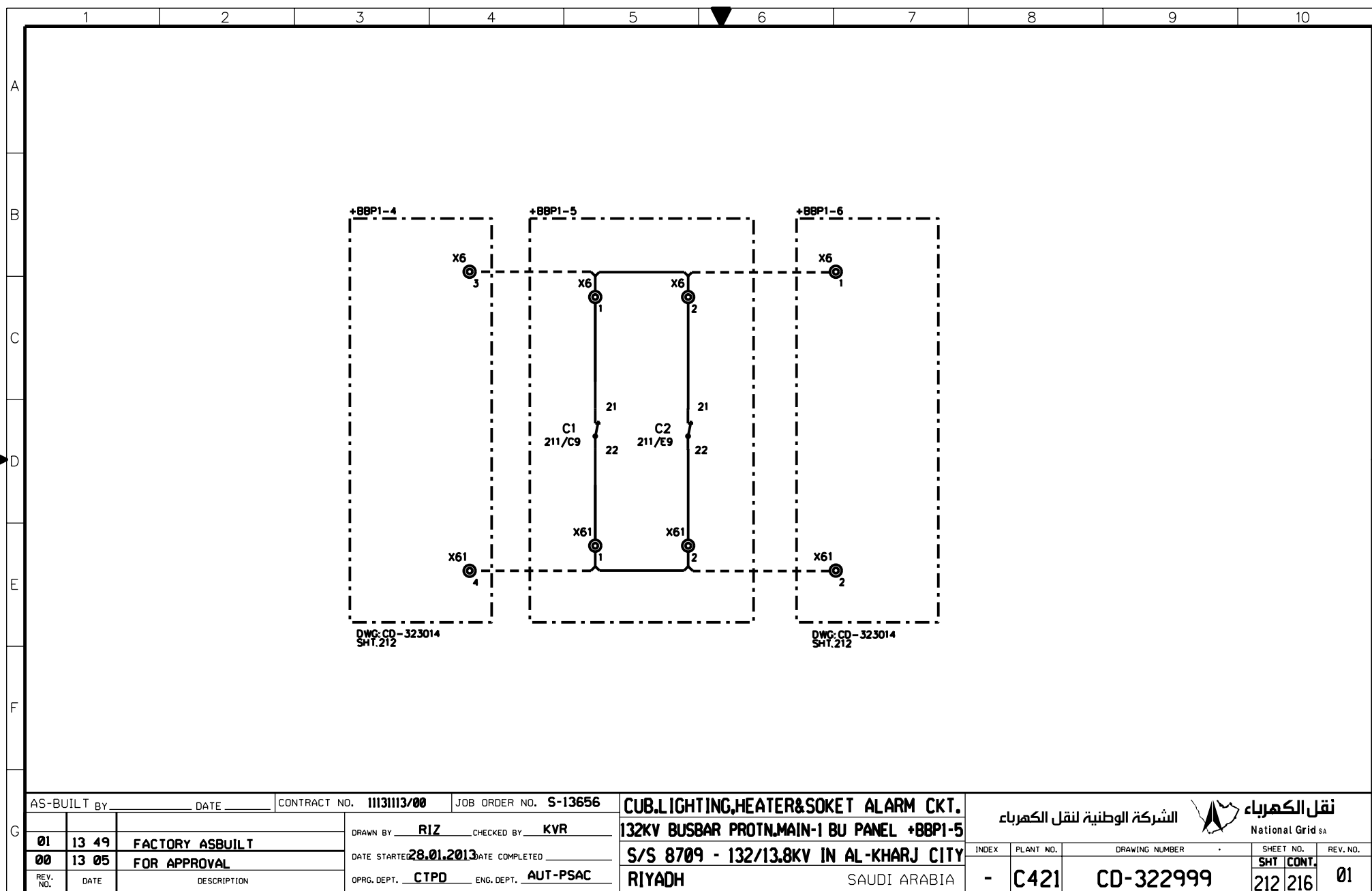
AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **11131113/00** JOB ORDER NO. **S-13656**

|          |       |                 |
|----------|-------|-----------------|
| 01       | 13 49 | FACTORY ASBUILT |
| 00       | 13 05 | FOR APPROVAL    |
| REV. NO. | DATE  | DESCRIPTION     |

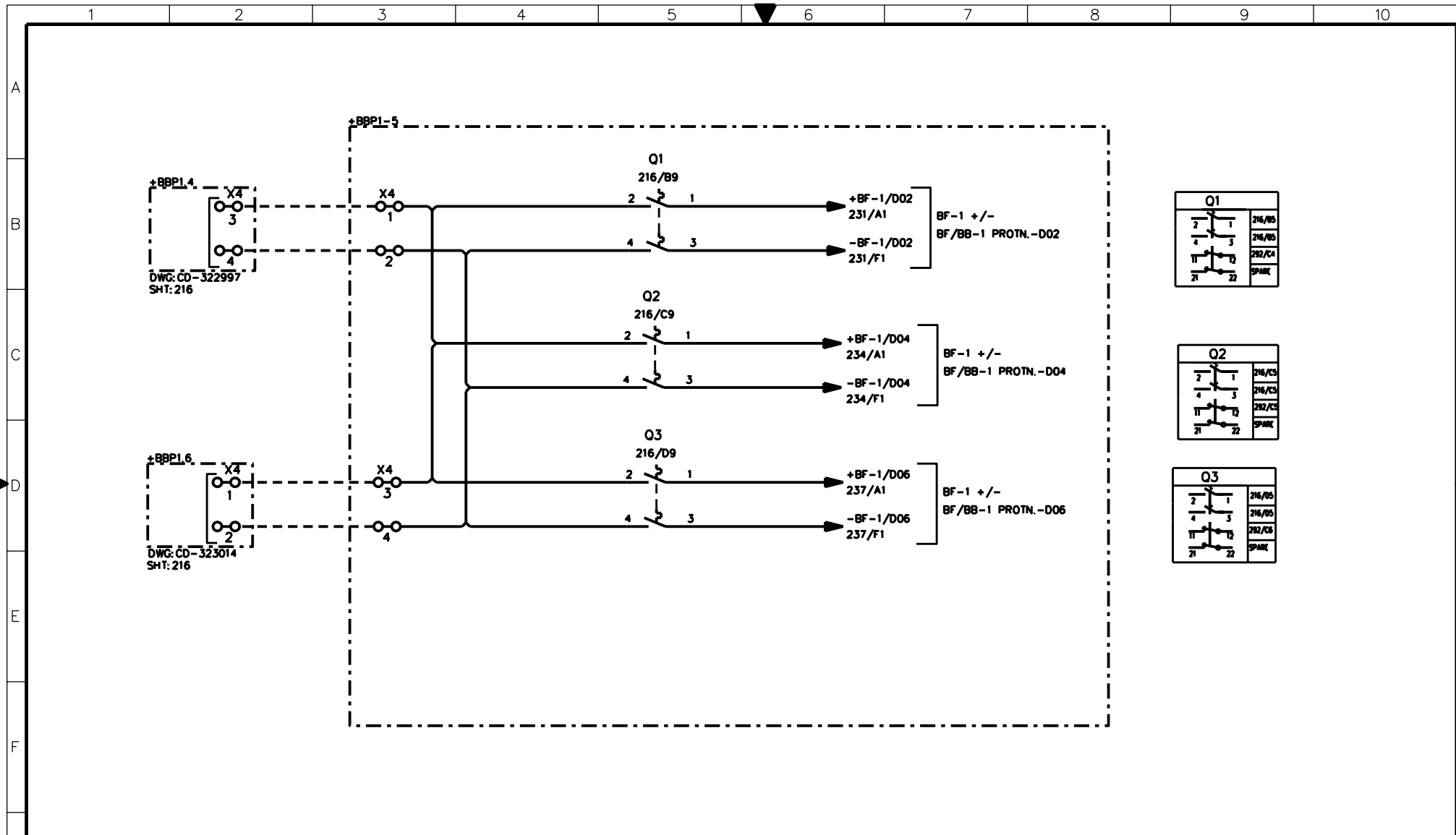
|                                |                            |
|--------------------------------|----------------------------|
| DRAWN BY <b>RIZ</b>            | CHECKED BY <b>KVR</b>      |
| DATE STARTED <b>28.01.2013</b> | DATE COMPLETED             |
| OPRG. DEPT. <b>CTPD</b>        | ENG. DEPT. <b>AUT-PSAC</b> |

**AC SUPPLY FOR ILLUMINATION & POWER SOCKET**  
**132KV BUSBAR PROTN. MAIN-1 BU PANEL +BBP1-5**  
**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**  
**RIYADH SAUDI ARABIA**

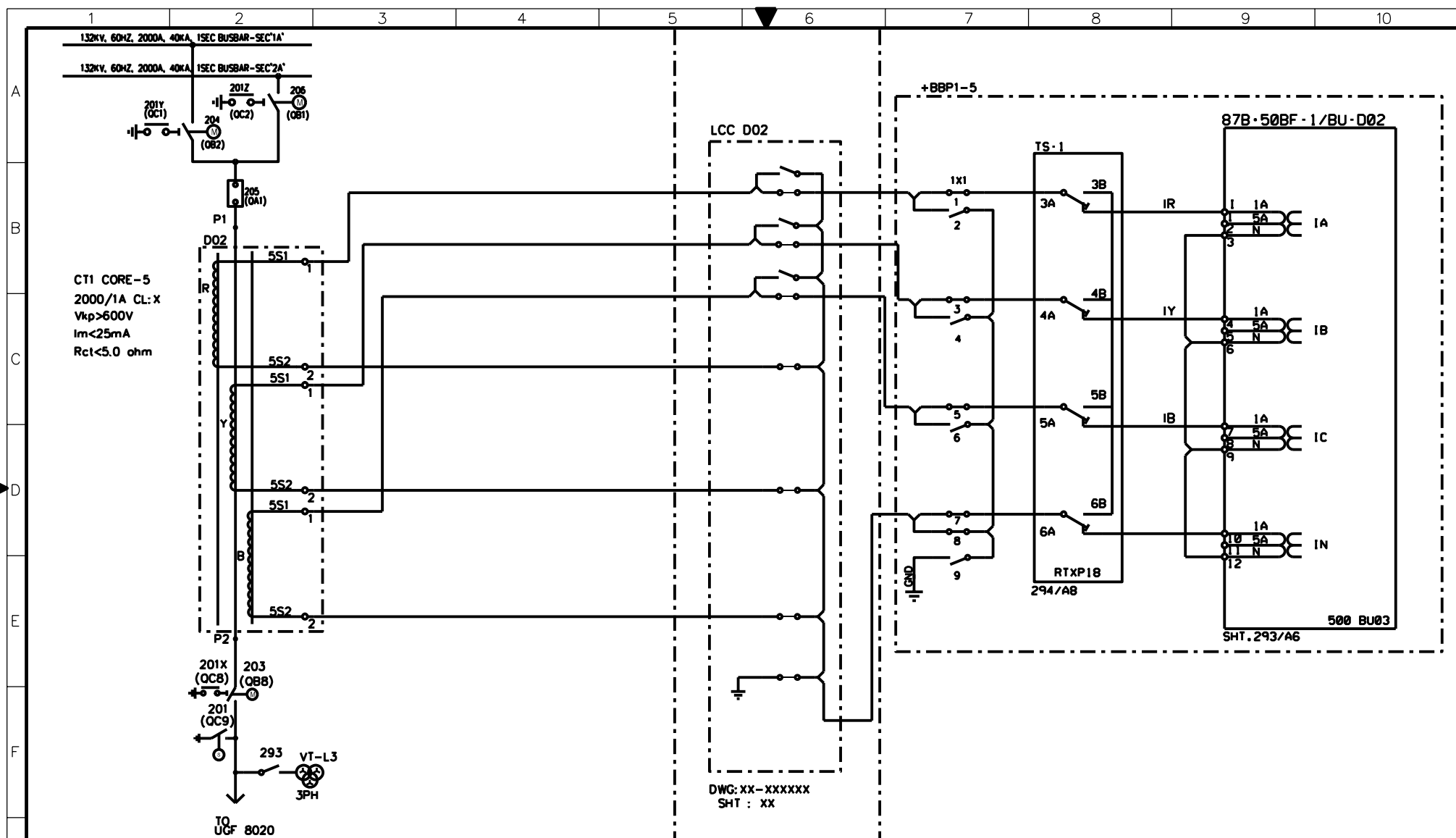
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| الشركة الوطنية لنقل الكهرباء |           | نقل الكهرباء   |           |
| National Grid sa             |           |                |           |
| INDEX                        | PLANT NO. | DRAWING NUMBER | SHEET NO. |
| -                            | C421      | CD-322999      | 211 212   |
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|                              |           |                | 01        |



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|---------------------------------|--|--|--|--|--|--|------------------------|--|--|--|--|--|--|--|
| AS-BUILT BY _____ DATE _____    |  |  | CONTRACT NO. 11131113/00               |  | JOB ORDER NO. S-13656                      |  | DC SUPPLY DISTRIBUTION |  |  |  | نقل الكهرباء<br>الشركة الوطنية لنقل الكهرباء<br>National Grid SA |  |  |  |
|                                 |  |  | DRAWN BY RIZ CHECKED BY KVR            |  | 132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBP1-5 |  |                        |  | INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO.<br>- C421 CD-322999 216 221 01 |  |  |  |  |  |
| 01 13 49<br>00 13 05            |  |  | DATE STARTED 28.01.2013 DATE COMPLETED |  | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY     |  |                        |  |  |  |  |  |  |  |
| FACTORY ASBUILT<br>FOR APPROVAL |  |  | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC   |  | RIYADH SAUDI ARABIA                        |  |                        |  |  |  |  |  |  |  |
| REV. NO. DATE DESCRIPTION       |  |  |  |  |  |  |                        |  |  |  |  |  |  |  |



AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **11131113/00** JOB ORDER NO. **S-13656**

| 01       | 13 49 | FACTORY ASBUILT |
|----------|-------|-----------------|
| 00       | 13 05 | FOR APPROVAL    |
| REV. NO. | DATE  | DESCRIPTION     |

DRAWN BY **RIZ** CHECKED BY **KVR**

DATE STARTED **28.01.2013** DATE COMPLETED \_\_\_\_\_

OPRG. DEPT. **CTPD** ENG. DEPT. **AUT-PSAC**

**CURRENT TRANSFORMER INPUTS -87B+50BF-1/BU-D02**

**132KV BUSBAR PROT.N.MAIN-1 BU PANEL +BBP1-5**

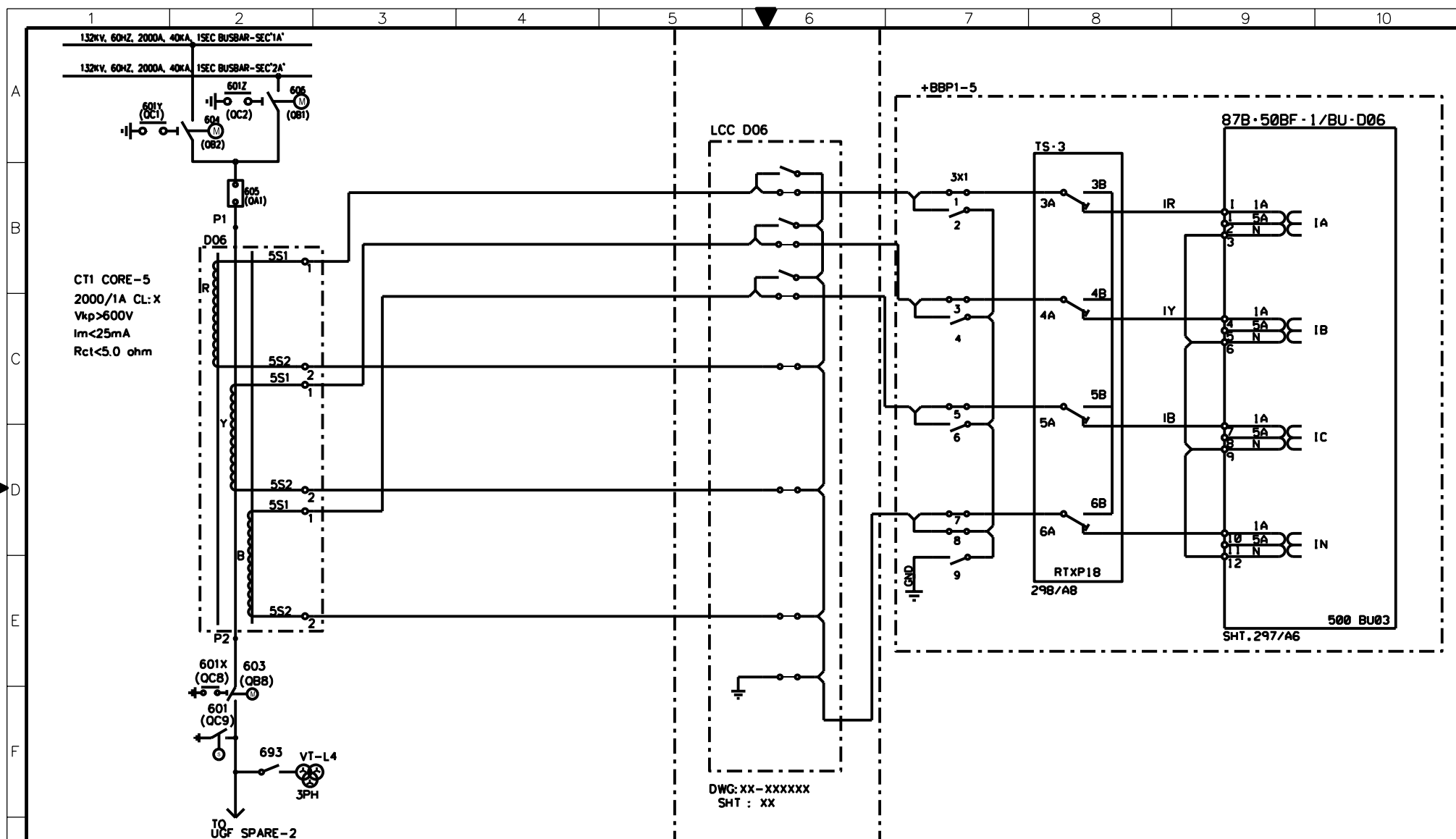
**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**

**R/YADH SAUDI ARABIA**

| الشركة الوطنية لنقل الكهرباء |           | National Grid sa |           |
|------------------------------|-----------|------------------|-----------|
| INDEX                        | PLANT NO. | DRAWING NUMBER   | SHEET NO. |
| -                            | C421      | CD-322999        | 221 222   |
|                              |           |                  | 01        |







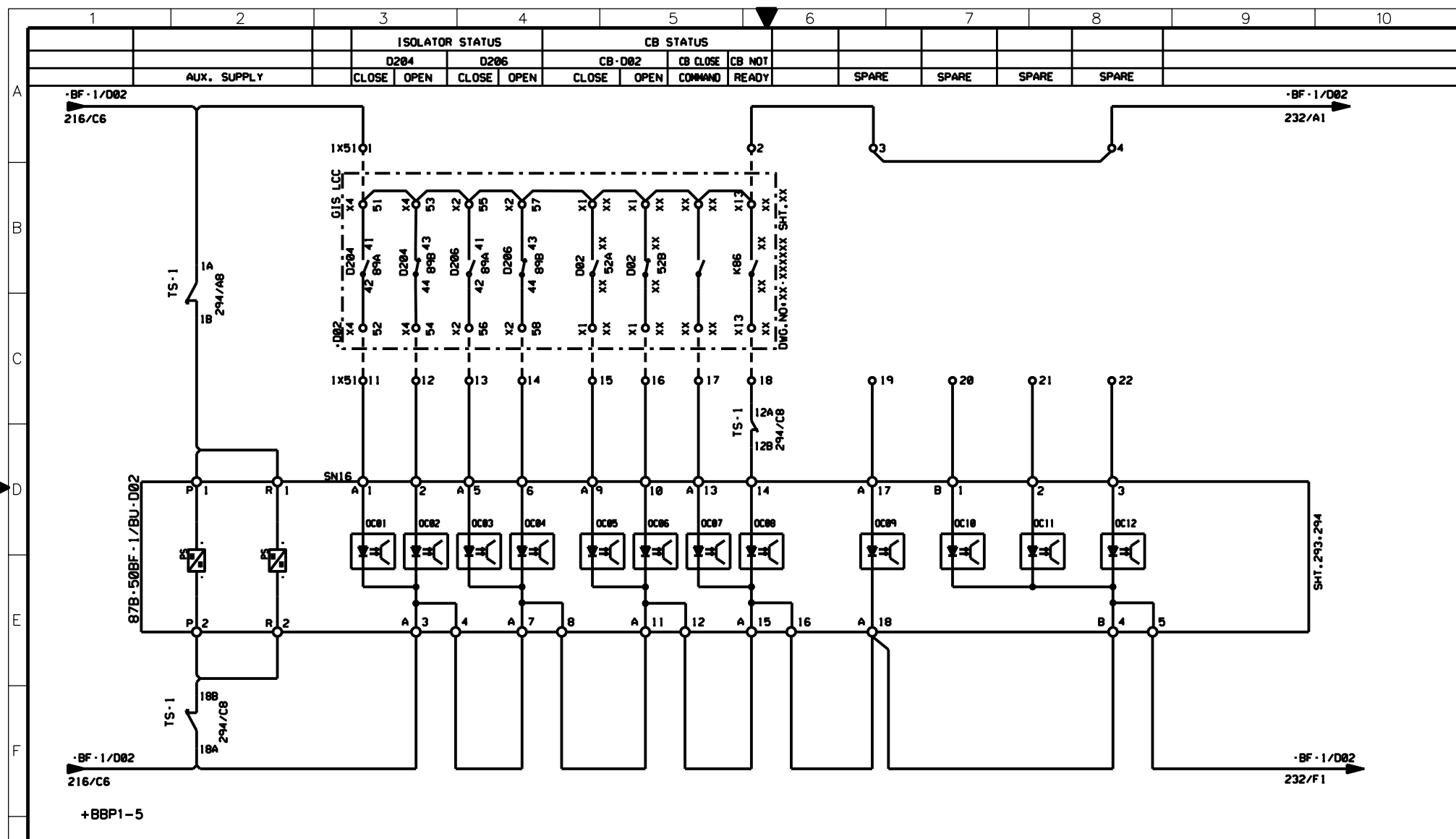
AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **11131113/00** JOB ORDER NO. **S-13656**

| 01       | 13 49 | FACTORY ASBUILT |
|----------|-------|-----------------|
| 00       | 13 05 | FOR APPROVAL    |
| REV. NO. | DATE  | DESCRIPTION     |

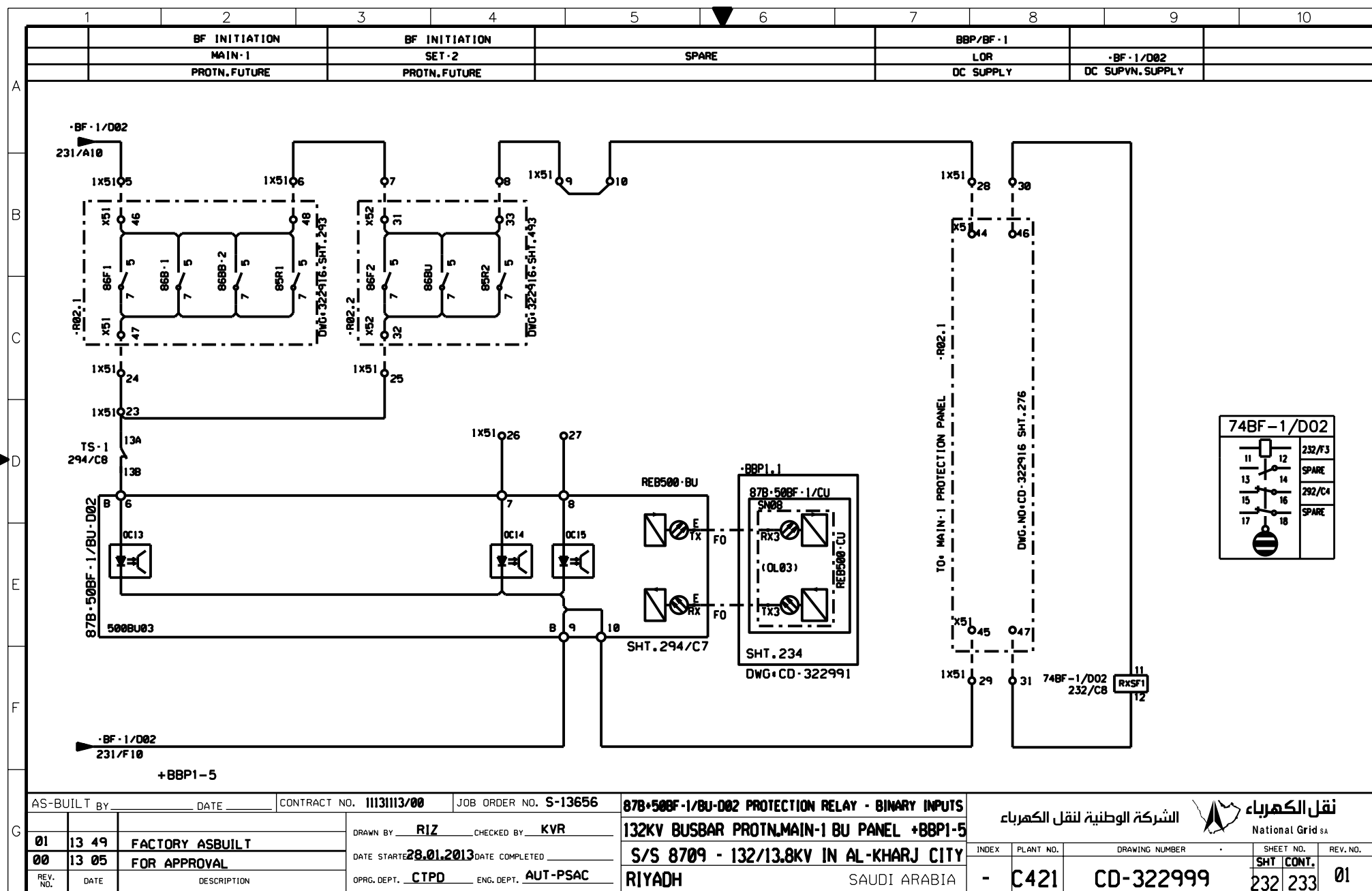
DRAWN BY **RIZ** CHECKED BY **KVR**  
 DATE STARTED **28.01.2013** DATE COMPLETED \_\_\_\_\_  
 OPRG. DEPT. **CTPD** ENG. DEPT. **AUT-PSAC**

**CURRENT TRANSFORMER INPUTS -87B+50BF-1/BU-D06**  
**132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBP1-5**  
**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**  
**RIYADH SAUDI ARABIA**

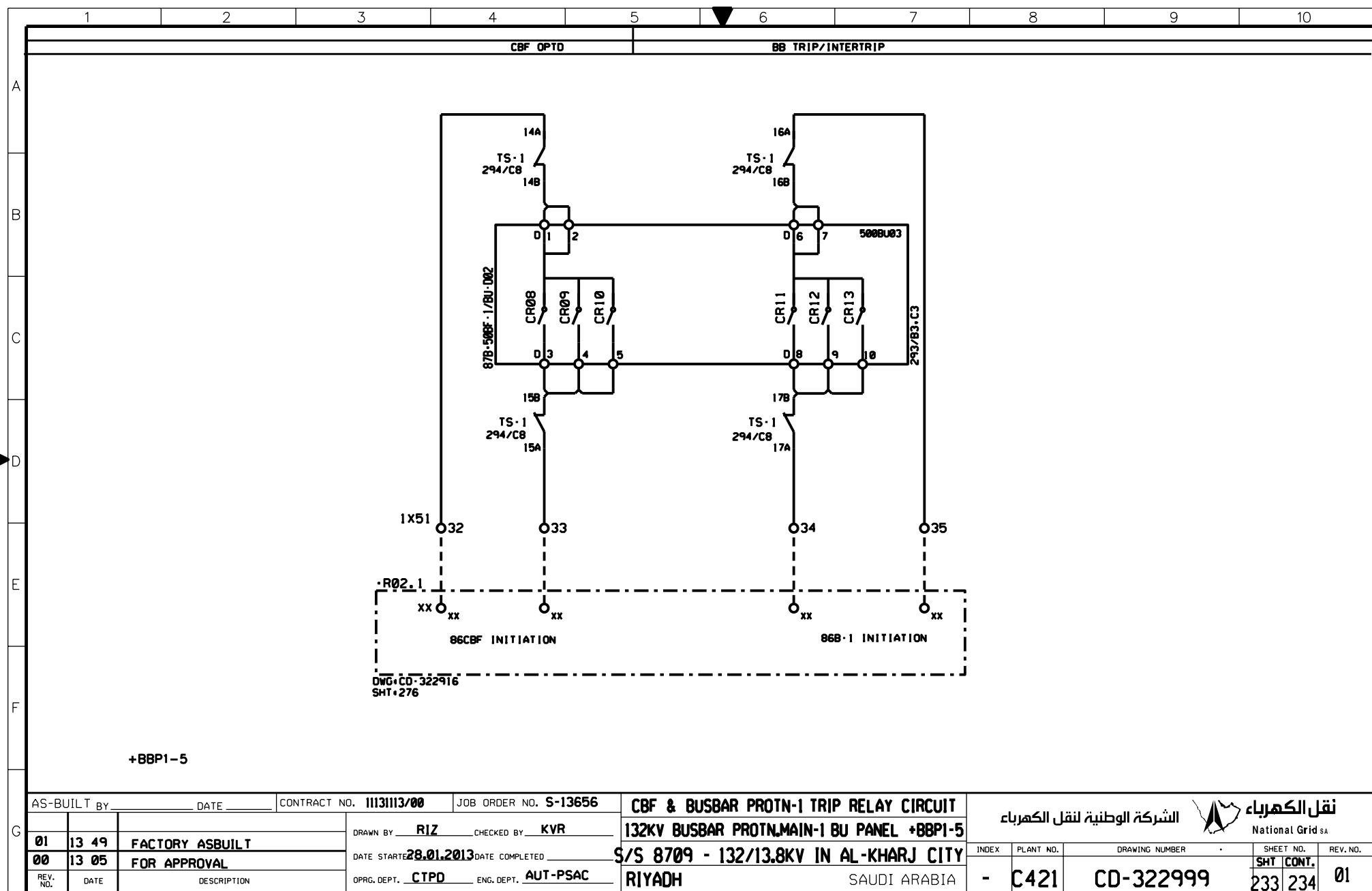
| الشركة الوطنية لنقل الكهرباء |           | National Grid sa |           |
|------------------------------|-----------|------------------|-----------|
| INDEX                        | PLANT NO. | DRAWING NUMBER   | SHEET NO. |
| -                            | C421      | CD-322999        | 223/231   |
|                              |           |                  | 01        |



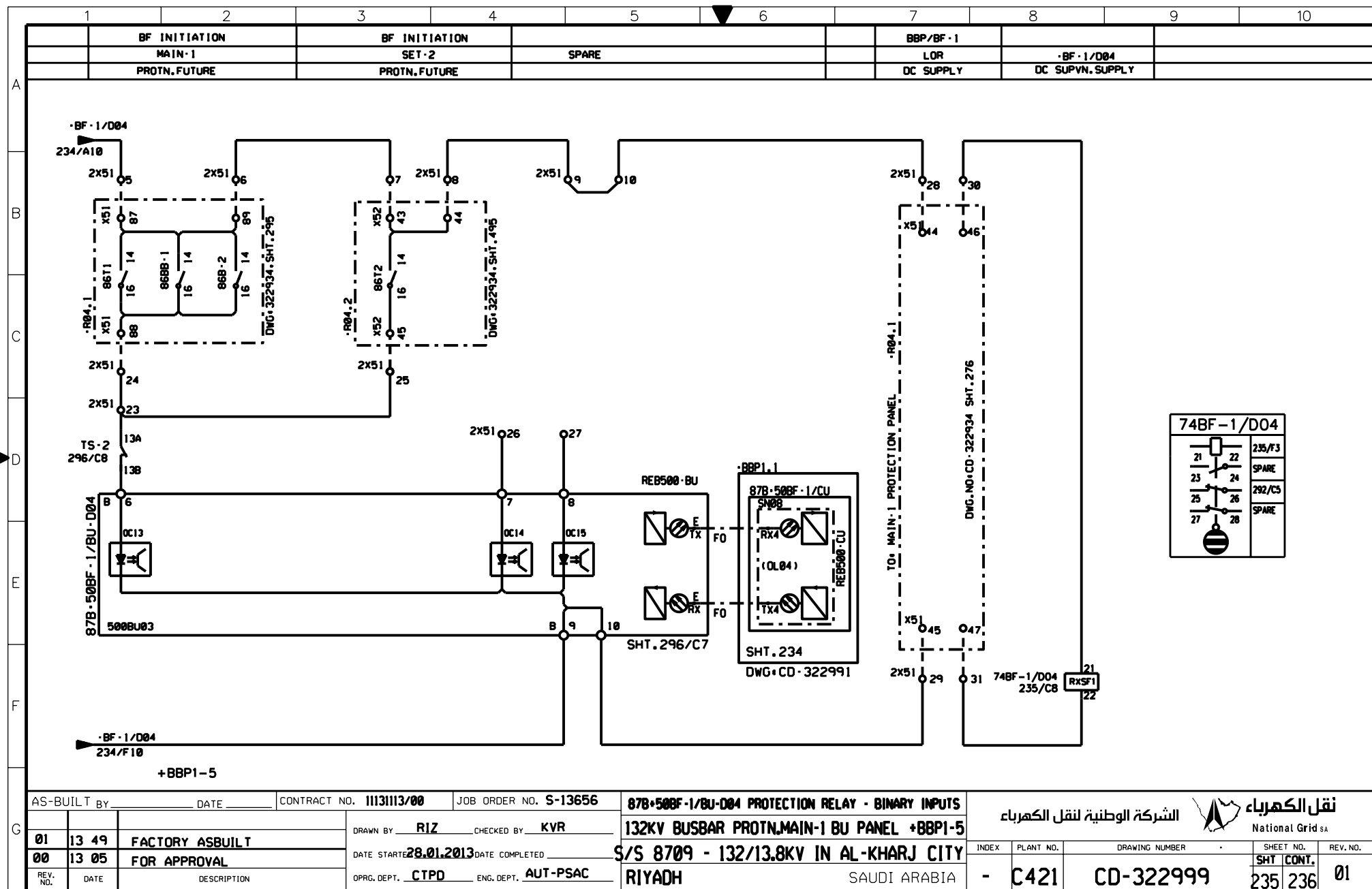
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|------------------------------|-------|--------------------------|--|--|--|--|--|---|--|
| AS-BUILT BY _____ DATE _____ |       | CONTRACT NO. 11131113/00 |  | JOB ORDER NO. S-13656                        |  | 87B-50BF-1/BU-D02 PROTECTION RELAY - BINARY INPUTS |  | الشركة الوطنية لنقل الكهرباء                      |  |
| 01                           | 13 49 | FACTORY ASBUILT          |  | DRAWN BY RIZ CHECKED BY KVR                  |  | 132KV BUSBAR PROTN, MAIN-1 BU PANEL +BBP1-5        |  | National Grid sa                                  |  |
| 00                           | 13 05 | FOR APPROVAL             |  | DATE STARTED 28.01.2013 DATE COMPLETED _____ |  | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY             |  | INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO. |  |
| REV. NO.                     | DATE  | DESCRIPTION              |  | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC         |  | RIYADH SAUDI ARABIA                                |  | - C421 CD-322999 231 232 01                       |  |



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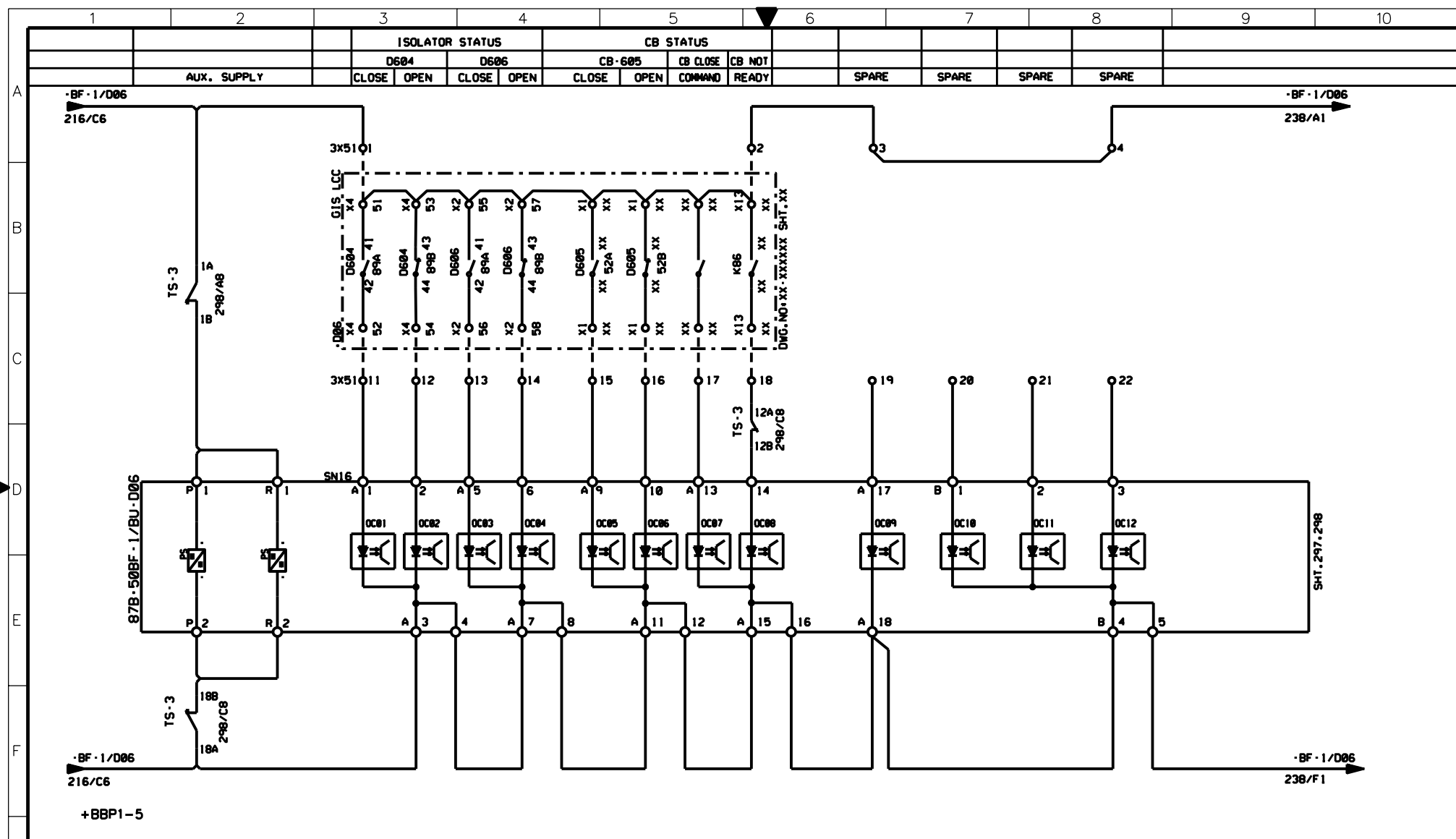






THIS DRAWING AND THE INFORMATION CONTAINED HEREIN ARE THE SOLE PROPERTY OF NGD200. NO REPRODUCTION IN FULL OR IN PART SHALL BE OBTAINED FROM THIS DOCUMENT WITHOUT THE WRITTEN CONSENT OF ITS OWNER.

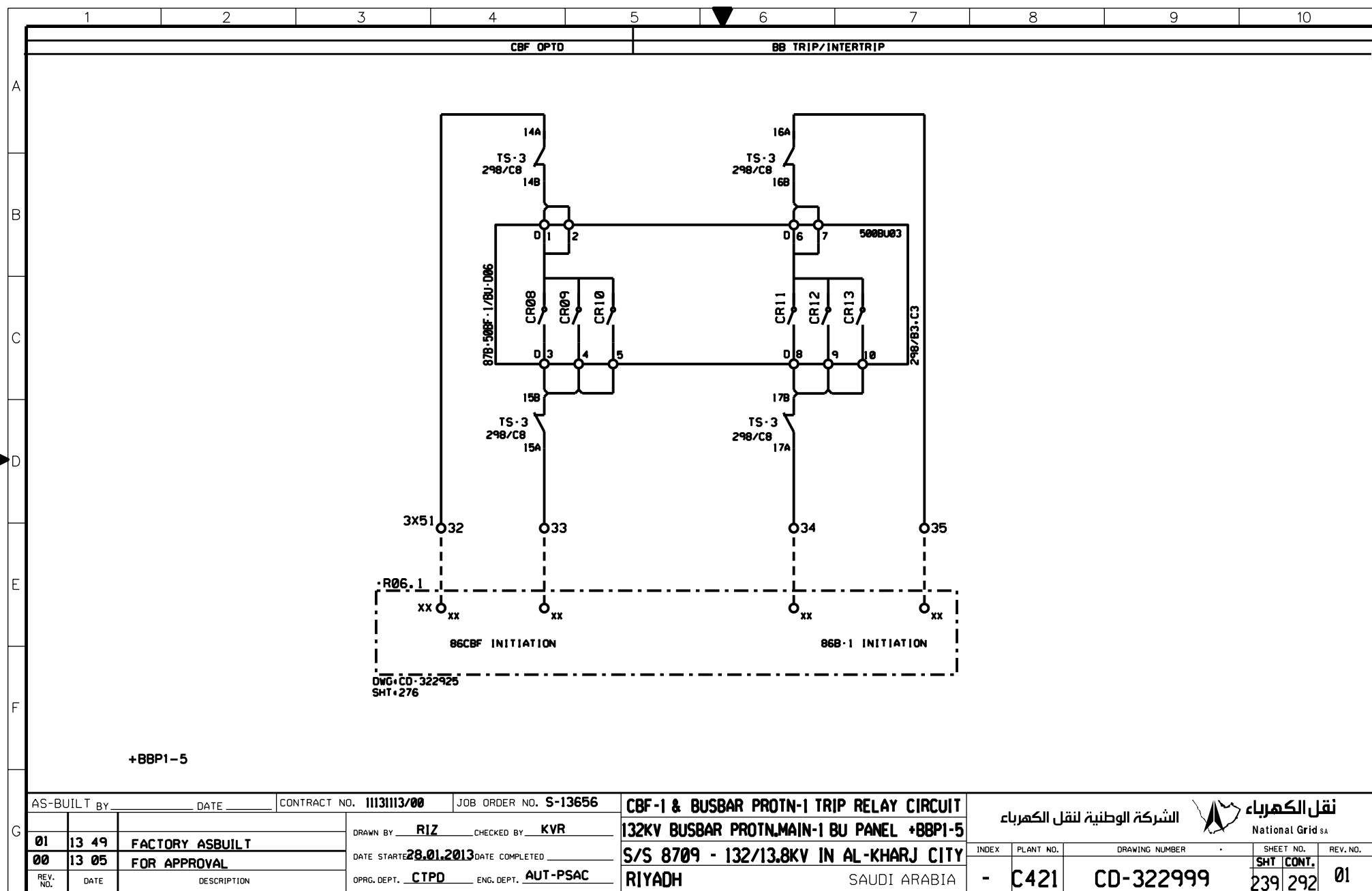


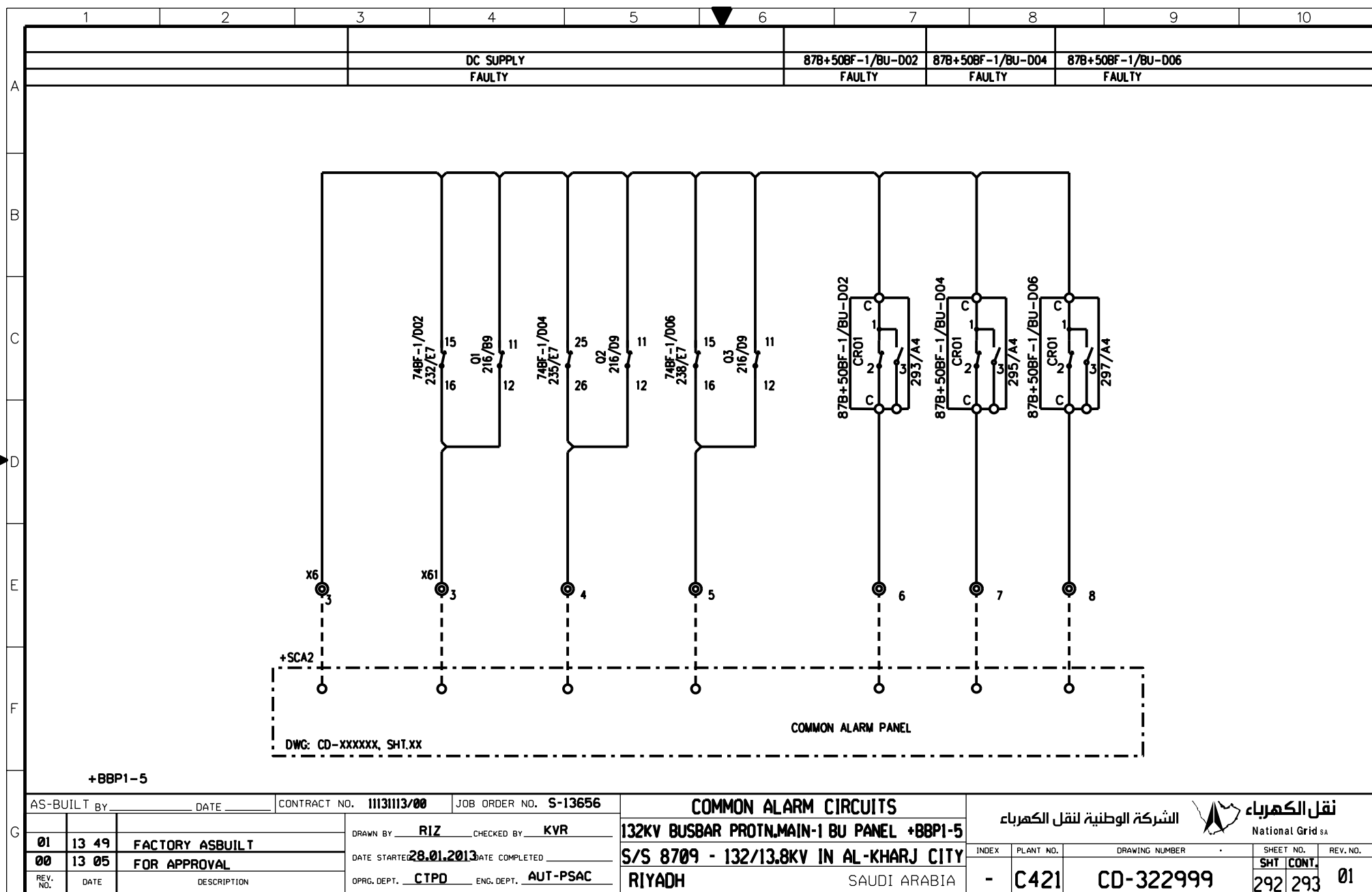


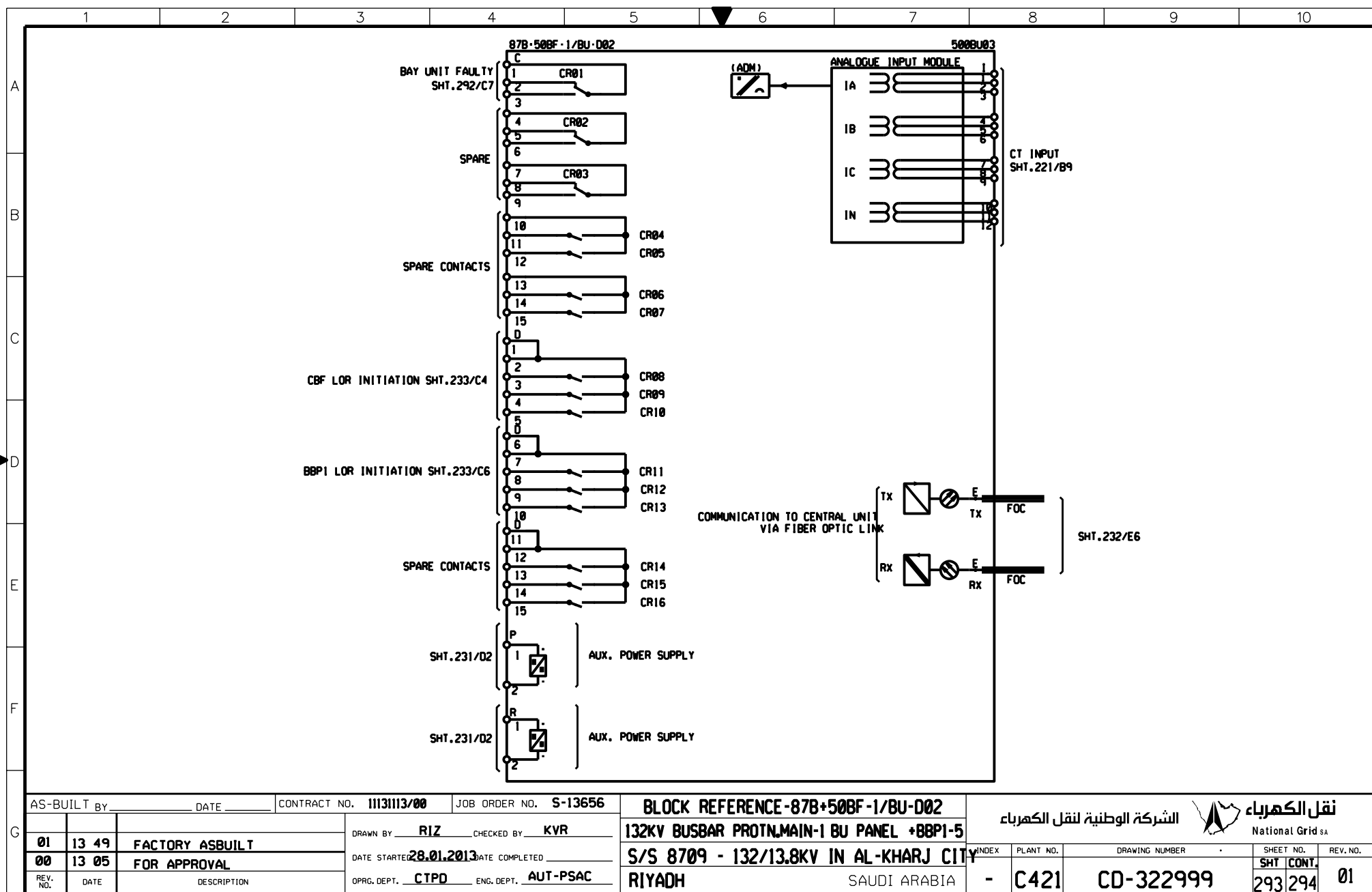
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|------------------------------|-------|--|-----------------------|--|--|------------------------------|-----------|----------------|-----------|
| AS-BUILT BY _____ DATE _____ |       | CONTRACT NO. 11131113/00                     | JOB ORDER NO. S-13656 | 87B-50BF-1/BU-D06 PROTECTION RELAY - BINARY INPUTS |  | الشركة الوطنية لنقل الكهرباء |           | نقل الكهرباء   |           |
| DRAWN BY RIZ CHECKED BY KVR  |       | DATE STARTED 28.01.2013 DATE COMPLETED _____ |                       | 132KV BUSBAR PROTN. MAIN-1 BU PANEL +BBP1-5        |  | National Grid sa             |           |                |           |
| FOR APPROVAL                 |       | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC         |                       | S/S 8709 - 132/13.8KV IN AL-KHARJ CITY             |  | INDEX                        | PLANT NO. | DRAWING NUMBER | SHEET NO. |
| REV. NO.                     | DATE  | DESCRIPTION                                  |                       | RIYADH SAUDI ARABIA                                |  | -                            | C421      | CD-322999      | 237       |
| 01                           | 13 49 | FACTORY ASBUILT                              |                       |  |  |                              |           |                | CONT.     |
| 00                           | 13 05 |  |                       |  |  |                              |           |                | 01        |

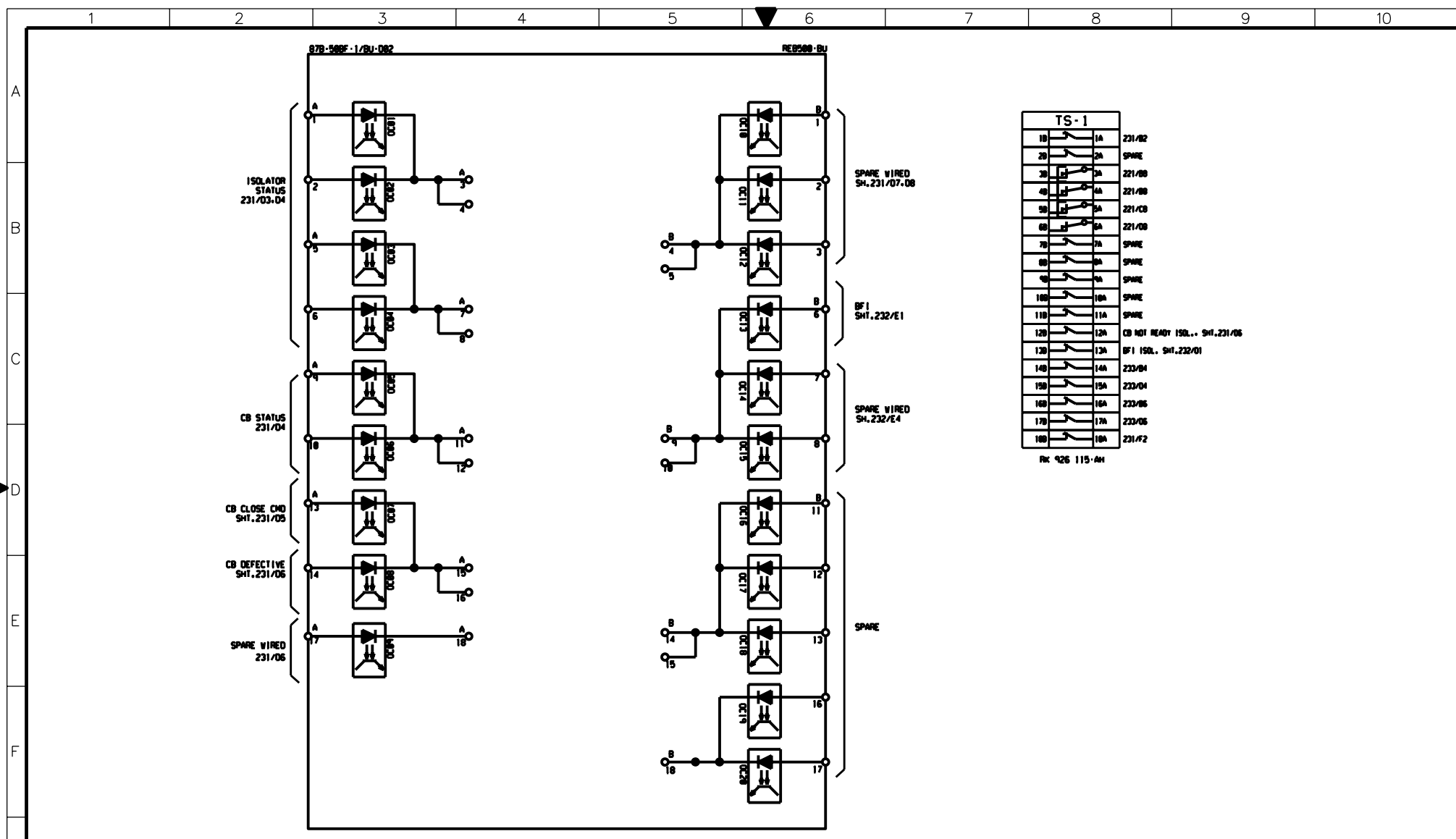








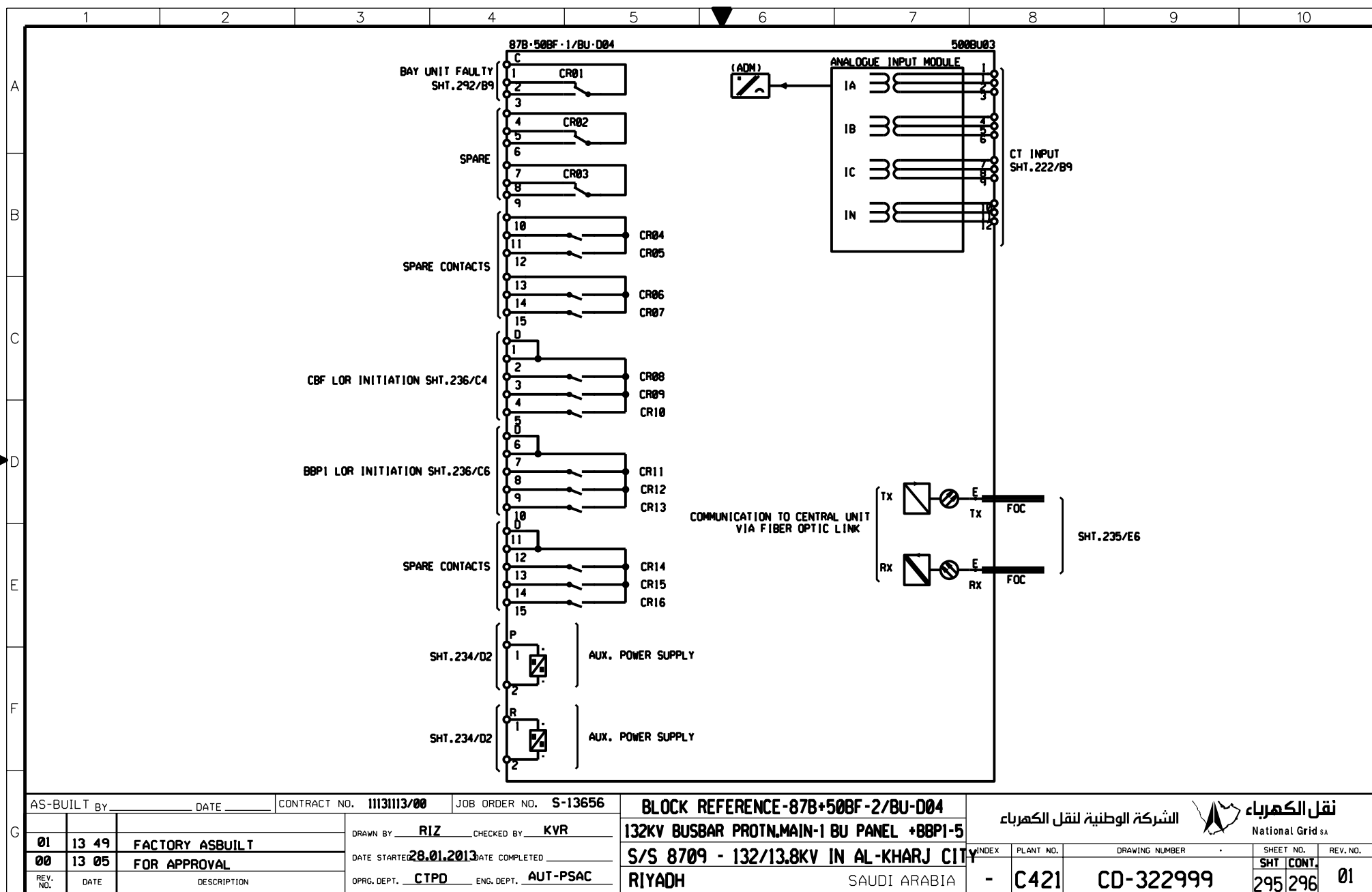




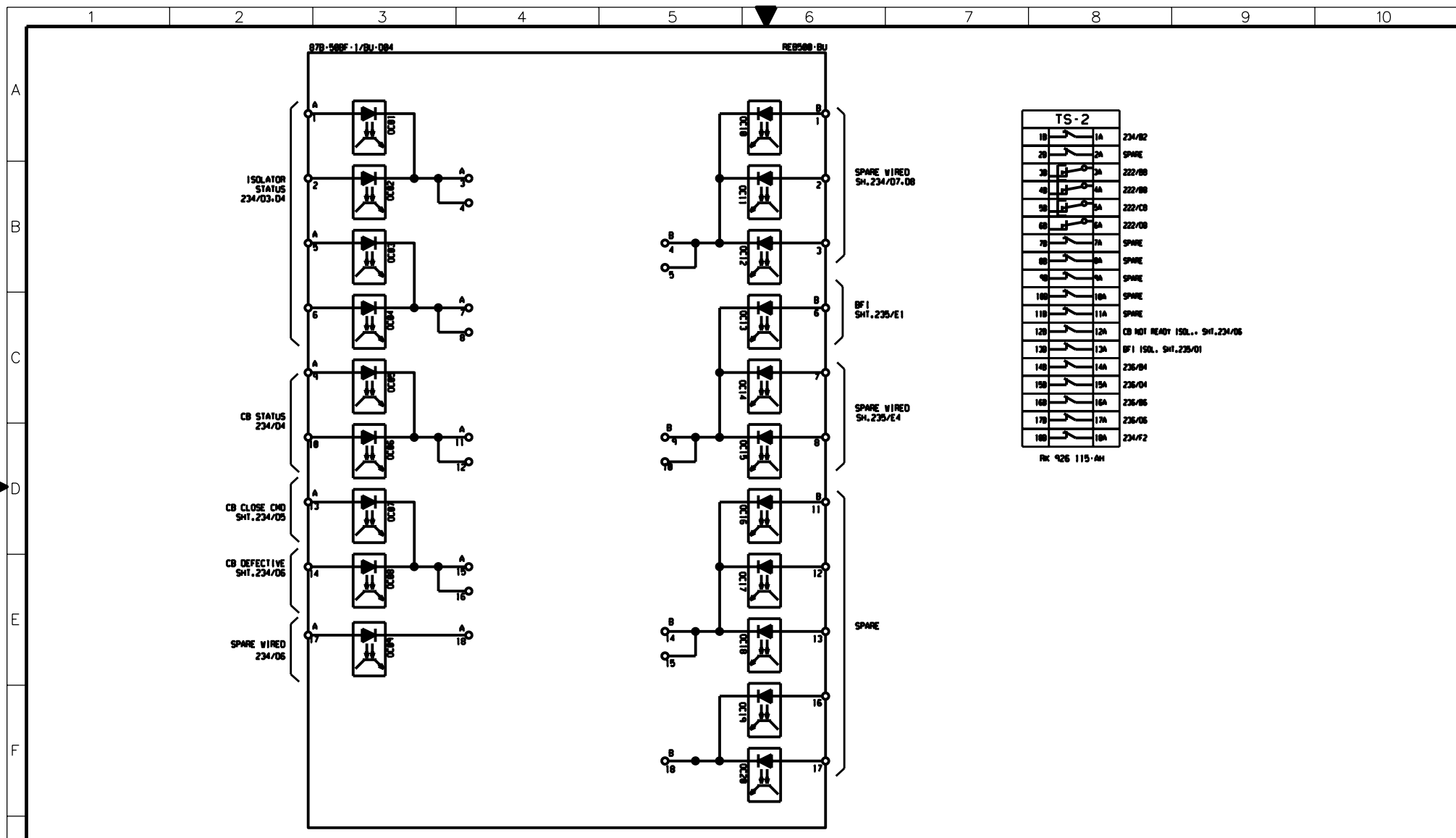
| TS-1 |     |                                 |
|------|-----|---------------------------------|
| 1B   | 1A  | 231/02                          |
| 2B   | 2A  | SPARE                           |
| 3B   | 3A  | 221/08                          |
| 4B   | 4A  | 221/08                          |
| 5B   | 5A  | 221/08                          |
| 6B   | 6A  | 221/08                          |
| 7B   | 7A  | SPARE                           |
| 8B   | 8A  | SPARE                           |
| 9B   | 9A  | SPARE                           |
| 10B  | 10A | SPARE                           |
| 11B  | 11A | SPARE                           |
| 12B  | 12A | CB NOT READY ISOL... SH1.231/06 |
| 13B  | 13A | BF I ISOL... SH1.232/01         |
| 14B  | 14A | 233/04                          |
| 15B  | 15A | 233/04                          |
| 16B  | 16A | 233/06                          |
| 17B  | 17A | 233/06                          |
| 18B  | 18A | 231/02                          |

RK 926 115-AM

|   |              |   |                              |   |             |                              |            |              |           |
|---|--------------|---|------------------------------|---|-------------|------------------------------|------------|--------------|-----------|
| AS-BUILT BY _____ DATE _____                      |              | CONTRACT NO. <b>1113113/00</b>                      | JOB ORDER NO. <b>S-13656</b> | <b>BLOCK REFERENCE-87B+50BF-1/BU-D02</b>          |             | الشركة الوطنية لنقل الكهرباء |            | نقل الكهرباء |           |
| DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b>         |              | DATE STARTED <b>28.01.2013</b> DATE COMPLETED _____ |                              | <b>132KV BUSBAR PROTN.MAIN-1 BU PANEL +88P1-5</b> |             | National Grid sa             |            |              |           |
| PRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b> |              | <b>\$/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b>      |                              | <b>RIYADH</b>                                     |             | <b>SAUDI ARABIA</b>          |            |              |           |
| REV. NO.  | DATE         | DESCRIPTION   |                              | INDEX   | PLANT NO.   | DRAWING NUMBER               | SHEET NO.  | REV. NO.     |           |
| <b>01</b>   | <b>13 49</b> | <b>FACTORY ASBUILT</b>                              |                              | -   | <b>C421</b> | <b>CD-322999</b>             | <b>294</b> | <b>295</b>   | <b>01</b> |
| <b>00</b>   | <b>13 05</b> | <b>FOR APPROVAL</b>                                 |                              |   |             |                              | <b>SH1</b> | <b>CONT.</b> |           |

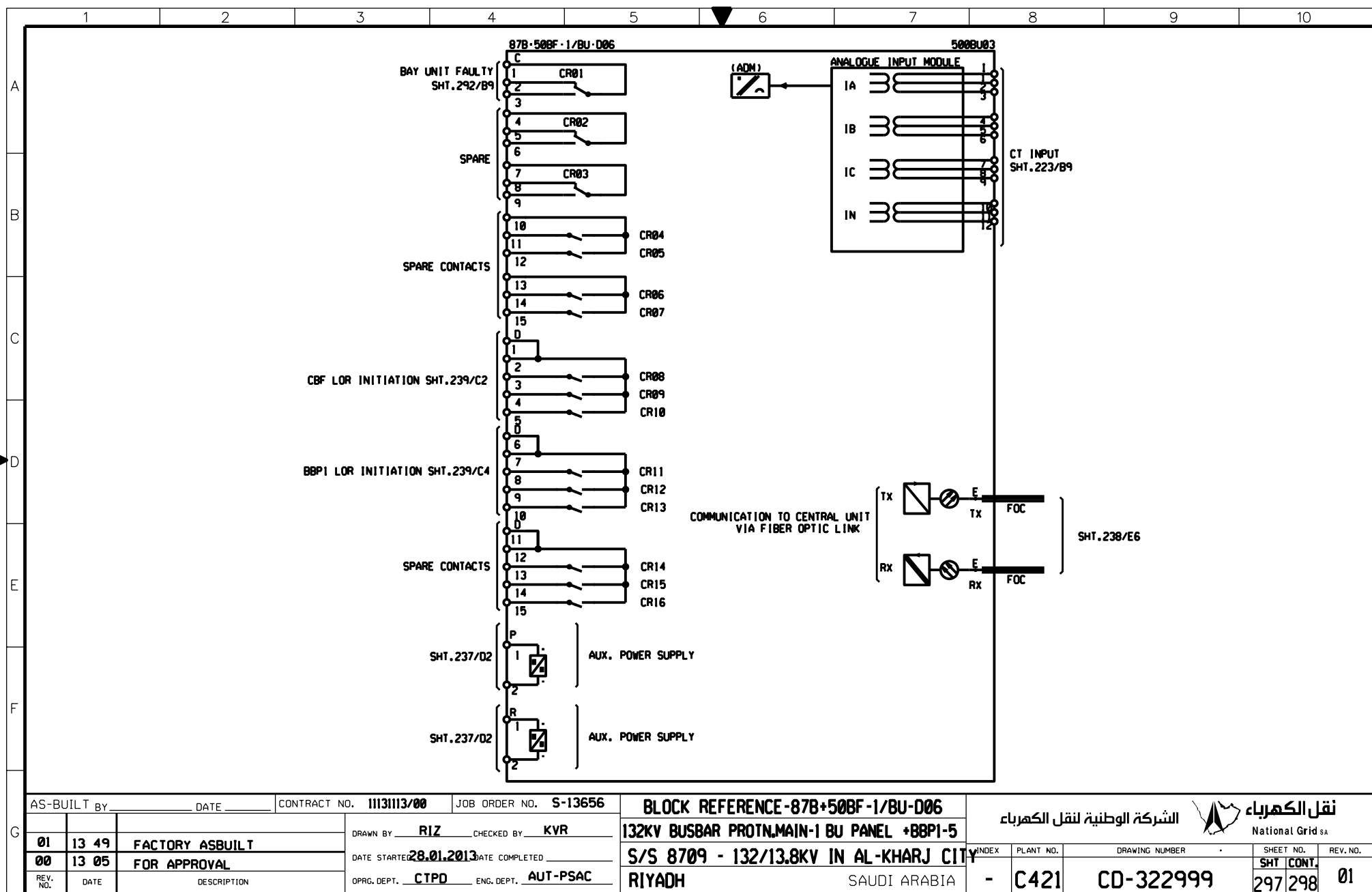


|   |  |  |                                 |  |                              |  |   |  |  |                              |             |                  |            |
|---|--|--|---------------------------------|--|------------------------------|--|---|--|--|------------------------------|-------------|------------------|------------|
| AS-BUILT BY _____ DATE _____                      |  |  | CONTRACT NO. <b>11131113/00</b> |  | JOB ORDER NO. <b>S-13656</b> |  | <b>BLOCK REFERENCE-87B+50BF-2/BU-D04</b>          |  |  | الشركة الوطنية لنقل الكهرباء |             |                  |            |
|   |  |  |                                 |  |                              |  | <b>132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBPI-5</b> |  |  | National Grid sa             |             |                  |            |
| DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b>         |  |  | DATE STARTED <b>28.01.2013</b>  |  | DATE COMPLETED _____         |  | <b>S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b>     |  |  | INDEX                        | PLANT NO.   | DRAWING NUMBER   | SHEET NO.  |
| PRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b> |  |  |                                 |  |                              |  | <b>RIYADH SAUDI ARABIA</b>                        |  |  | -                            | <b>C421</b> | <b>CD-322999</b> | <b>295</b> |
| REV. NO. _____                                    |  |  | DATE _____                      |  | DESCRIPTION _____            |  |   |  |  |                              |             |                  | REV. NO.   |
|   |  |  |                                 |  |                              |  |   |  |  |                              |             |                  | <b>01</b>  |

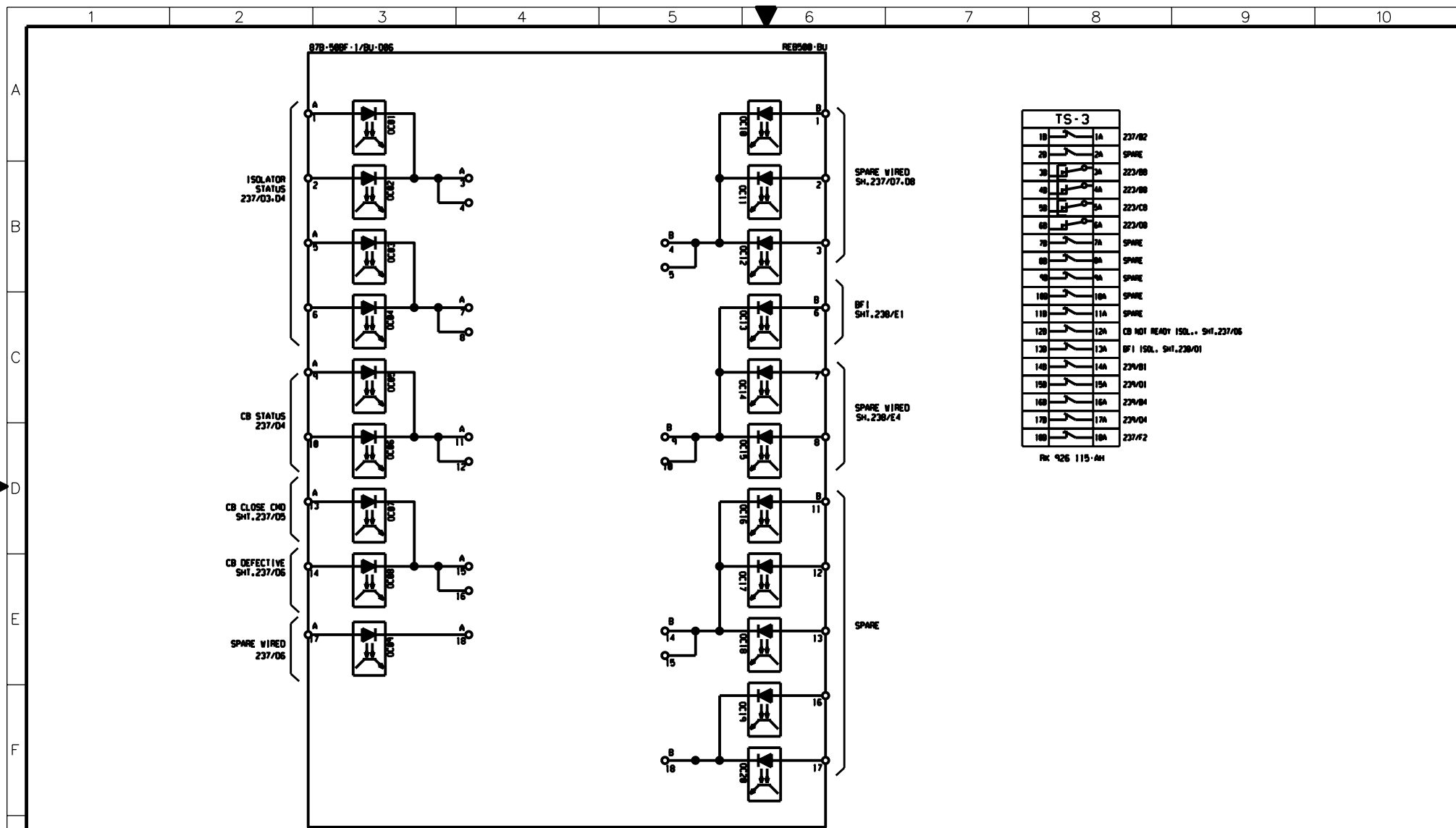


| TS-2          |     |                                 |  |
|---------------|-----|---------------------------------|--|
| 1B            | 1A  | 234/02                          |  |
| 2B            | 2A  | SPARE                           |  |
| 3B            | 3A  | 222/08                          |  |
| 4B            | 4A  | 222/08                          |  |
| 5B            | 5A  | 222/08                          |  |
| 6B            | 6A  | 222/08                          |  |
| 7B            | 7A  | SPARE                           |  |
| 8B            | 8A  | SPARE                           |  |
| 9B            | 9A  | SPARE                           |  |
| 10B           | 10A | SPARE                           |  |
| 11B           | 11A | SPARE                           |  |
| 12B           | 12A | CB NOT READY ISOL... SH1.234/06 |  |
| 13B           | 13A | BF I ISOL. SH1.235/01           |  |
| 14B           | 14A | 235/04                          |  |
| 15B           | 15A | 235/04                          |  |
| 16B           | 16A | 235/06                          |  |
| 17B           | 17A | 235/06                          |  |
| 18B           | 18A | 234/72                          |  |
| Rc 926 115-AM |     |                                 |  |

|   |  |   |  |   |  |   |  |                                 |  |                                       |  |
|---|--|---|--|---|--|---|--|---------------------------------|--|---------------------------------------|--|
| AS-BUILT BY _____ DATE _____              |  | CONTRACT NO. <b>1113113/00</b>                      |  | JOB ORDER NO. <b>S-13656</b>                      |  | <b>BLOCK REFERENCE-87B+50BF-2/BU-D04</b>          |  | الشركة الوطنية لنقل الكهرباء    |  | نقل الكهرباء                          |  |
| DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b> |  | DATE STARTED <b>28.01.2013</b> DATE COMPLETED _____ |  | PRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b> |  | <b>132KV BUSBAR PROTN.MAIN-1 BU PANEL +BBP1-5</b> |  | National Grid sa                |  |                                       |  |
| REV. NO. <b>01</b> DATE <b>13 49</b>      |  | DESCRIPTION <b>FACTORY ASBUILT</b>                  |  |   |  | <b>\$/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b>    |  | INDEX <b>C421</b>               |  | PLANT NO. <b>CD-322999</b>            |  |
| REV. NO. <b>00</b> DATE <b>13 05</b>      |  | DESCRIPTION <b>FOR APPROVAL</b>                     |  |   |  | <b>RIYADH SAUDI ARABIA</b>                        |  | DRAWING NUMBER <b>CD-322999</b> |  | SHEET NO. <b>296</b> CONT. <b>297</b> |  |
|   |  |   |  |   |  |   |  |                                 |  | REV. NO. <b>01</b>                    |  |







| TS-3 |     |                                 |
|------|-----|---------------------------------|
| 1B   | 1A  | 237/02                          |
| 2B   | 2A  | SPARE                           |
| 3B   | 3A  | 223/08                          |
| 4B   | 4A  | 223/08                          |
| 5B   | 5A  | 223/08                          |
| 6B   | 6A  | 223/08                          |
| 7B   | 7A  | SPARE                           |
| 8B   | 8A  | SPARE                           |
| 9B   | 9A  | SPARE                           |
| 10B  | 10A | SPARE                           |
| 11B  | 11A | SPARE                           |
| 12B  | 12A | CB NOT READY ISOL... SH1.237/06 |
| 13B  | 13A | BF I ISOL. SH1.238/01           |
| 14B  | 14A | 239/01                          |
| 15B  | 15A | 239/01                          |
| 16B  | 16A | 239/04                          |
| 17B  | 17A | 239/04                          |
| 18B  | 18A | 237/02                          |

RK 926 115-AM

AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **1113113/00** JOB ORDER NO. **S-13656**

| 01       | 13 49 | FACTORY ASBUILT |
|----------|-------|-----------------|
| 00       | 13 05 | FOR APPROVAL    |
| REV. NO. | DATE  | DESCRIPTION     |

DRAWN BY **RIZ** CHECKED BY **KVR**  
 DATE STARTED **28.01.2013** DATE COMPLETED \_\_\_\_\_  
 OPRG. DEPT. **CTPD** ENG. DEPT. **AUT-PSAC**

**BLOCK REFERENCE-87B+50BF-1/BU-D06**  
**132KV BUSBAR PROT.N.MAIN-1 BU PANEL +B8P1-5**  
**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**  
**RIYADH SAUDI ARABIA**

| الشركة الوطنية لنقل الكهرباء |           | نقل الكهرباء     |           |          |
|------------------------------|-----------|------------------|-----------|----------|
| National Grid sa             |           | National Grid sa |           |          |
| INDEX                        | PLANT NO. | DRAWING NUMBER   | SHEET NO. | REV. NO. |
| -                            | C421      | CD-322999        | 298       | 01       |

|  |   |   |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|---|---|----|
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--|---|---|---|---|---|---|---|---|---|----|

|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|---|------------------|------------------------|----|------------------|--|----|------------------|--|----|------------------|--|----|------------------|--------------------------|----|------------------|-----------------------|----|
| A | <b>REFERENCE</b> | <b>1X1<br/>CT CKT.</b> |    | <b>REFERENCE</b> | <b>1X51<br/>CON &amp; PROTIN CKTS.</b> |    | <b>REFERENCE</b> | <b>2X51<br/>CON &amp; PROTIN CKTS.</b> |    | <b>REFERENCE</b> | <b>3X51<br/>CON &amp; PROTIN CKTS.</b> |    | <b>REFERENCE</b> | <b>X61<br/>ALM. CKT.</b> |    | <b>REFERENCE</b> | <b>X3<br/>AC CKT.</b> |    |
|   |                  | 221/B7                 | 1  |                  | 231/A3                                 | 1  |                  | 234/A3                                 | 1  |                  | 237/A3                                 | 1  |                  | 212/E5                   | 1  |                  | 211/A3                | 1  |
|   |                  | 221/B7                 | 2  |                  | 231/A5                                 | 2  |                  | 234/A5                                 | 2  |                  | 237/A5                                 | 2  |                  | 212/E5                   | 2  |                  | 211/A7                | 2  |
|   |                  | 221/C7                 | 3  |                  | 231/A6                                 | 3  |                  | 234/A6                                 | 3  |                  | 237/A6                                 | 3  |                  | 292/E4                   | 3  |                  | 211/A3                | 3  |
|   |                  | 221/C7                 | 4  |                  | 231/A8                                 | 4  |                  | 234/A8                                 | 4  |                  | 237/A8                                 | 4  |                  | 292/E5                   | 4  |                  | 211/A7                | 4  |
|   |                  | 221/C7                 | 5  |                  | 232/A1                                 | 5  |                  | 235/A1                                 | 5  |                  | 238/A1                                 | 5  |                  | 292/E6                   | 5  |                  | 211/B3                | 5  |
|   |                  | 221/C7                 | 6  |                  | 232/A2                                 | 6  |                  | 235/A2                                 | 6  |                  | 238/A2                                 | 6  |                  | 292/E7                   | 6  |                  | 211/B7                | 6  |
|   |                  | 221/C7                 | 7  |                  | 232/A2                                 | 7  |                  | 235/A2                                 | 7  |                  | 238/A2                                 | 7  |                  | 292/E8                   | 7  |                  | 211/B3                | 7  |
|   |                  | 221/D7                 | 8  |                  | 232/A3                                 | 8  |                  | 235/A3                                 | 8  |                  | 238/A3                                 | 8  |                  | SPARE                    | 8  |                  | 211/B7                | 8  |
|   |                  | 221/D7                 | 9  |                  | 232/A4                                 | 9  |                  | 235/A4                                 | 9  |                  | 238/A4                                 | 9  |                  | SPARE                    | 9  |                  | SPARE                 | 9  |
| B |                  | 221/D7                 | 10 |                  | 232/A4                                 | 10 |                  | 235/A4                                 | 10 |                  | 238/A4                                 | 10 |                  | SPARE                    | 10 |                  | SPARE                 | 10 |
|   |                  | SPARE                  |    |                  | 231/C3                                 | 11 |                  | 234/C3                                 | 11 |                  | 237/C3                                 | 11 |                  | SPARE                    |    |                  | SPARE                 |    |
|   |                  |                        |    |                  | 231/C3                                 | 12 |                  | 234/C3                                 | 12 |                  | 237/C3                                 | 12 |                  | SPARE                    |    |                  | SPARE                 |    |
|   |                  |                        |    |                  | 231/C4                                 | 13 |                  | 234/C4                                 | 13 |                  | 237/C4                                 | 13 |                  | SPARE                    |    |                  | SPARE                 |    |
|   |                  |                        |    |                  | 231/C4                                 | 14 |                  | 234/C4                                 | 14 |                  | 237/C4                                 | 14 |                  | SPARE                    |    |                  | SPARE                 |    |
|   |                  |                        |    |                  | 231/C4                                 | 15 |                  | 234/C4                                 | 15 |                  | 237/C4                                 | 15 |                  | SPARE                    |    |                  | SPARE                 |    |
|   |                  |                        |    |                  | 231/C5                                 | 16 |                  | 234/C5                                 | 16 |                  | 237/C5                                 | 16 |                  | SPARE                    |    |                  | SPARE                 |    |
|   |                  |                        |    |                  | 231/C5                                 | 17 |                  | 234/C5                                 | 17 |                  | 237/C5                                 | 17 |                  | SPARE                    |    |                  | SPARE                 |    |
|   |                  |                        |    |                  | 231/C6                                 | 18 |                  | 234/C6                                 | 18 |                  | 237/C6                                 | 18 |                  | SPARE                    |    |                  | SPARE                 |    |
|   |                  |                        |    |                  | 231/C6                                 | 19 |                  | 234/C6                                 | 19 |                  | 237/C6                                 | 19 |                  | SPARE                    |    |                  | SPARE                 |    |
| C |                  |                        |    |                  | 231/C7                                 | 20 |                  | 234/C7                                 | 20 |                  | 237/C7                                 | 20 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 231/C8                                 | 21 |                  | 234/C8                                 | 21 |                  | 237/C8                                 | 21 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 231/C8                                 | 22 |                  | 234/C8                                 | 22 |                  | 237/C8                                 | 22 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 232/D1                                 | 23 |                  | 235/D1                                 | 23 |                  | 238/D1                                 | 23 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 232/C1                                 | 24 |                  | 235/C1                                 | 24 |                  | 238/C1                                 | 24 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 232/C3                                 | 25 |                  | 235/C3                                 | 25 |                  | 238/C3                                 | 25 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 232/D4                                 | 26 |                  | 235/D4                                 | 26 |                  | 238/D4                                 | 26 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 232/D5                                 | 27 |                  | 235/D5                                 | 27 |                  | 238/D5                                 | 27 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 232/B8                                 | 28 |                  | 235/B8                                 | 28 |                  | 238/B8                                 | 28 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 232/F8                                 | 29 |                  | 235/F8                                 | 29 |                  | 238/F8                                 | 29 |                  |                          |    |                  |                       |    |
| D |                  |                        |    |                  | 232/B8                                 | 30 |                  | 235/B8                                 | 30 |                  | 238/B8                                 | 30 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 232/F8                                 | 31 |                  | 235/F8                                 | 31 |                  | 238/F8                                 | 31 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 233/E4                                 | 32 |                  | 236/E4                                 | 32 |                  | 239/E4                                 | 32 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 233/E4                                 | 33 |                  | 236/E4                                 | 33 |                  | 239/E4                                 | 33 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 233/E6                                 | 34 |                  | 236/E6                                 | 34 |                  | 239/E6                                 | 34 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | 233/E7                                 | 35 |                  | 236/E7                                 | 35 |                  | 239/E7                                 | 35 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | SPARE                                  | 36 |                  | SPARE                                  | 36 |                  | SPARE                                  | 36 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | SPARE                                  | 37 |                  | SPARE                                  | 37 |                  | SPARE                                  | 37 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | SPARE                                  | 38 |                  | SPARE                                  | 38 |                  | SPARE                                  | 38 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  | SPARE                                  | 39 |                  | SPARE                                  | 39 |                  | SPARE                                  | 39 |                  |                          |    |                  |                       |    |
| E |                  |                        |    |                  | SPARE                                  | 40 |                  | SPARE                                  | 40 |                  | SPARE                                  | 40 |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
| F |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |
|   |                  |                        |    |                  |  |    |                  |  |    |                  |  |    |                  |                          |    |                  |                       |    |

|                  |                        |    |                  |                        |    |                  |                       |    |                  |                             |   |                  |                         |   |
|------------------|------------------------|----|------------------|------------------------|----|------------------|-----------------------|----|------------------|-----------------------------|---|------------------|-------------------------|---|
| <b>REFERENCE</b> | <b>2X1<br/>CT CKT.</b> |    | <b>REFERENCE</b> | <b>X4<br/>DC CKTS.</b> |    | <b>REFERENCE</b> | <b>XTJ<br/>T.JACK</b> |    | <b>REFERENCE</b> | <b>XSH<br/>SPACE HEATER</b> |   | <b>REFERENCE</b> | <b>X6<br/>ALM. CKT.</b> |   |
|                  | 222/B7                 | 1  |                  | 216/B3                 | 1  |                  | 211/C3                | 1  |                  | 211/E6                      | 1 |                  | 212/C5                  | 1 |
|                  | 222/B7                 | 2  |                  | 216/B3                 | 2  |                  | 211/D3                | 2  |                  | 211/F6                      | 2 |                  | 212/C5                  | 2 |
|                  | 222/C7                 | 3  |                  | 216/D3                 | 3  |                  | 211/D3                | 3  |                  | SPARE                       | 3 |                  | 292/E3                  | 3 |
|                  | 222/C7                 | 4  |                  |                        | 4  |                  | SPARE                 | 4  |                  | SPARE                       | 4 |                  | SPARE                   | 4 |
|                  | 222/C7                 | 5  |                  |                        | 5  |                  | SPARE                 | 5  |                  |                             | 5 |                  |                         | 5 |
|                  | 222/C7                 | 6  |                  |                        | 6  |                  | SPARE                 | 6  |                  |                             |   |                  |                         |   |
|                  | 222/C7                 | 7  |                  |                        | 7  |                  | SPARE                 | 7  |                  |                             |   |                  |                         |   |
|                  | 222/D7                 | 8  |                  |                        | 8  |                  | SPARE                 | 8  |                  |                             |   |                  |                         |   |
|                  | 222/D7                 | 9  |                  |                        | 9  |                  | SPARE                 | 9  |                  |                             |   |                  |                         |   |
|                  | SPARE                  | 10 |                  |                        | 10 |                  | SPARE                 | 10 |                  |                             |   |                  |                         |   |

|                  |                        |    |                  |                          |    |                  |                       |    |                  |                        |    |                  |                       |    |                  |                             |   |                  |                         |   |
|------------------|------------------------|----|------------------|--------------------------|----|------------------|-----------------------|----|------------------|------------------------|----|------------------|-----------------------|----|------------------|-----------------------------|---|------------------|-------------------------|---|
| <b>REFERENCE</b> | <b>3X1<br/>CT CKT.</b> |    | <b>REFERENCE</b> | <b>X61<br/>ALM. CKT.</b> |    | <b>REFERENCE</b> | <b>X3<br/>AC CKT.</b> |    | <b>REFERENCE</b> | <b>X4<br/>DC CKTS.</b> |    | <b>REFERENCE</b> | <b>XTJ<br/>T.JACK</b> |    | <b>REFERENCE</b> | <b>XSH<br/>SPACE HEATER</b> |   | <b>REFERENCE</b> | <b>X6<br/>ALM. CKT.</b> |   |
|                  | 223/B7                 | 1  |                  | 216/B3                   | 1  |                  | 211/C3                | 1  |                  | 216/B3                 | 1  |                  | 211/C3                | 1  |                  | 211/E6                      | 1 |                  | 212/C5                  | 1 |
|                  | 223/B7                 | 2  |                  | 216/B3                   | 2  |                  | 211/D3                | 2  |                  | 216/B3                 | 2  |                  | 211/D3                | 2  |                  | 211/F6                      | 2 |                  | 212/C5                  | 2 |
|                  | 223/C7                 | 3  |                  | 216/D3                   | 3  |                  | 211/D3                | 3  |                  | 216/D3                 | 3  |                  | 211/D3                | 3  |                  | SPARE                       | 3 |                  | 292/E3                  | 3 |
|                  | 223/C7                 | 4  |                  |                          | 4  |                  | SPARE                 | 4  |                  |                        | 4  |                  | SPARE                 | 4  |                  | SPARE                       | 4 |                  | SPARE                   | 4 |
|                  | 223/C7                 | 5  |                  |                          | 5  |                  | SPARE                 | 5  |                  |                        | 5  |                  | SPARE                 | 5  |                  |                             | 5 |                  |                         | 5 |
|                  | 223/C7                 | 6  |                  |                          | 6  |                  | SPARE                 | 6  |                  |                        | 6  |                  | SPARE                 | 6  |                  |                             |   |                  |                         |   |
|                  | 223/C7                 | 7  |                  |                          | 7  |                  | SPARE                 | 7  |                  |                        | 7  |                  | SPARE                 | 7  |                  |                             |   |                  |                         |   |
|                  | 223/D7                 | 8  |                  |                          | 8  |                  | SPARE                 | 8  |                  |                        | 8  |                  | SPARE                 | 8  |                  |                             |   |                  |                         |   |
|                  | 223/D7                 | 9  |                  |                          | 9  |                  | SPARE                 | 9  |                  |                        | 9  |                  | SPARE                 | 9  |                  |                             |   |                  |                         |   |
|                  | SPARE                  | 10 |                  |                          | 10 |                  | SPARE                 | 10 |                  |                        | 10 |                  | SPARE                 | 10 |                  |                             |   |                  |                         |   |

AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **11131113/00** JOB ORDER NO. **S-13656**

|          |       |                 |   |
|----------|-------|-----------------|---|
| 01       | 13 49 | FACTORY ASBUILT | DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b>           |
| 00       | 13 05 | FOR APPROVAL    | DATE STARTED <b>28.01.2013</b> DATE COMPLETED _____ |
| REV. NO. | DATE  | DESCRIPTION     | OPRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b>  |

**TERMINAL BLOCKS PANEL +BB1-5**  
**132KV BUSBAR PROTIN.MAIN-1 BU PANEL +BBPI-5**  
**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**  
**RIYADH SAUDI ARABIA**

|  |           |                |                       |
|--|-----------|----------------|-----------------------|
| الشركة الوطنية لنقل الكهرباء<br>National Grid sa |           | نقل الكهرباء   |                       |
| INDEX  | PLANT NO. | DRAWING NUMBER | SHEET NO.             |
| -  | C421      | CD-322999      | 301 NIL               |
|  |           |                | REV. NO.<br><b>01</b> |